2 RESPONSES TO COMMENTS

A NEPA PROCESS

Comment A-1: The responsibility for issuing the environmental impact statement (EIS) is misplaced. Thus the integrity and the validity of the *National Environmental Policy Act* (NEPA) review have been seriously compromised. The responsibility belongs to the "Defense Acquisition Executive." NEPA requires preparation of a draft EIS (DEIS) and final EIS (FEIS) by federal officials responsible for decisions that may have a significant impact on health or the environment. There is only one impact-generating decision to be made with respect to the chemical weapons currently stored at Pueblo Chemical Depot (PCD): a decision on what kind of facility (or facilities) to construct and operate at that depot to destroy the weapons there. [*Document 96-2*]
Response A-1: Comment is noted. An EIS related to the destruction of the assembled chemical weapon (ACW) stockpile at PCD, entitled *Destruction of Chemical Munitions at Pueblo Chemical Depot, Colorado, Draft Environmental Impact Statement* (PCD EIS; see U.S. Army 2001), was prepared by the Program Manager for Chemical Demilitarization (PMCD). However, the Program Manager for ACWA (PMACWA) is responsible for developing alternative systems for ACW destruction, and PCD has been chosen by ACWA as a potential location for pilot testing as an alternative technology.

Comment A-2: Who does ACWA report to? [*Document 79-1*]
Response A-2: The Assembled Chemical Weapons Assessment (ACWA) program reports to the U.S. Department of Defense, Under Secretary of Defense for Acquisition, Logistics, and Technology.

Comment A-3: Who decides where to put a pilot plant? What is the deciding factor for determining whether to build a pilot, and what are the major criteria? Economics should be considered. [*Documents 39-7, 40-5, 55-1, 55-2, 59-1, 64-6, 64-6a, 76-1, 79-2*]
Response A-3: NEPA requires that an EIS evaluate all reasonable alternatives. PMACWA has determined that the four installations considered in the EIS are reasonable alternatives for the EIS. The factors considered when deciding whether to construct and operate an ACWA facility at any installation may include environmental impacts, economic considerations, engineering information, ACW stockpile status, and institutional factors. The decision of whether to pilot test an ACWA facility at any installation will be described in the Record of Decision published in the *Federal Register*. A description of the post EIS decision process has been added to Section 2.4 of the ACWA EIS.

Comment A-4: Please extend the comment period by the 45 days announced in the Notice of Availability. Not enough time was allowed for comment. [*Documents 30-1, 36-1, 49-2, 96-1, 109-1*]
Response A-4: A notice was placed in the *Federal Register* announcing a 45-day extension to the comment period. The extended period ended on August 9, 2000.

Comment A-5: Will there be another session for public input closer to August 9? [*Document 33-1*]
Response A-5: No further public meetings were held.

Comment A-6: On the basis of what has happened to date, there is a lack of trust in the decision-making process and the decision makers. In addition, the decision makers do not interact with members of the community. [*Documents 15-2, 21-1, 21-4, 41-3, 44-2, 44-3, 75-6, 79-5*]
Response A-6: The process for selecting one or more alternative technologies and locations for pilot testing is a transparent one. From the beginning, it has involved stakeholders in technology evaluation and environmental assessment. PMACWA has followed all procedures for public involvement required by NEPA. In addition, through the ACWA Dialogue, the development of ACWA technologies has included public participation.

Comment A-7: Will there be a report on what people had to say? Will some or all public comments be considered? [*Documents 1-1, 79-3, 104-1*]
Response A-7: All documents (letters, e-mail, faxes, and transcripts) received from the public during the comment period were reviewed to identify comments on the ACWA DEIS. These documents were scanned and are located in Chapter 3 of this volume of the ACWA FEIS. The documents were marked to indicate the location of comments, and the marks are shown next to the scanned documents in Chapter 3 of this volume of the ACWA FEIS. Responses to these comments appear here in Chapter 2. To locate and identify comments and the responses to the issues raised, refer to the tables in Chapter 1 of this volume. Please note that the comments here in Chapter 2 may be abstracted, or the comments of several individuals may be summarized into one comment.

Statements related to the incineration technologies addressed in the PCD EIS and other comments related to the PCD EIS are not considered in this ACWA EIS; they are considered in responses to comments in the PCD EIS. General statements of fact or opinion, statements refuting other individual's statements, or statements that did not address the content of the ACWA EIS or the PMACWA NEPA process were not identified as comments, and thus they are not addressed here in Volume 2 of the ACWA EIS.

Comment A-8: The ACWA EIS doesn't say anything, and it is slowing down the process at Blue Grass Army Depot (BGAD). [*Document 76-2*]
Response A-8: The ACWA EIS contains a detailed analysis of the environmental impacts of constructing and operating an ACWA pilot test facility at BGAD. This EIS is required by federal regulation before the U.S. Department of Defense (DOD) can decide to pilot test alternative technologies. These technologies were developed in part to address public concern that there should be alternatives to incineration for stockpile destruction at BGAD.

Comment A-9: Because counties surrounding PCD are affected, information on incineration and alternatives and the agricultural risk assessment should be made available to elected officials and the public in the counties to the north, east, and south of the depot. Of particular note are Crowley, Otero, and El Paso Counties. [*Document 39-6*]
Response A-9: Comment is noted.

B ACWA EIS AND PCD EIS COORDINATION

Comment B-1: How can some state that the incinerator is the preferred method at PCD if the Army has not made that choice? [*Document 39-4*]
Response B-1: The ACWA EIS is being prepared to help DOD decide what technologies to pilot test at which installations. The ACWA EIS does not address incineration technologies. For the decision process related to chemical demilitarization at PCD, please see the PCD EIS.

Comment B-2: This is an objection to reading two documents on the same site that come to vastly different conclusions on the basis of the same data. [*Document 49-1*]
Response B-2: The need for two documents is based on the fact that two different actions being considered by two different organizations were analyzed. One action is the selection of a technology for destroying the entire stockpile at PCD; this action is addressed in the PCD EIS. The other action is the selection of technologies and installations for pilot testing ACWA technology systems; this action is addressed in the ACWA EIS. Because these are different actions, there were variations in the assumptions that were used for the analyses, and, consequently, there were some differences in the results.

Comment B-3: The decision to bifurcate the NEPA review for Pueblo was a mistake. This mistake should be corrected by issuing a single FEIS for the decision at Pueblo. [*Document 96-3*]
Response B-3: The need for two documents is based on the fact that two different actions were being analyzed by two different organizations. One action is the selection of a technology for destroying only the stockpile at PCD. This action is addressed in the PCD EIS. The other action is the selection of technologies and installations for pilot testing ACWA technology systems at one or more of four installations; this latter action is addressed in the ACWA EIS.

Comment B-4: Similar information should be presented in similar formats for easier comparison between the PCD EIS and ACWA EIS. A similar numbering system should be used for the two EISs. There are inconsistencies between the documents regarding power supply, water supply, wetlands, water consumption, contaminant emissions, and communication upgrades. A great deal more effort needs to be taken to ensure the environmental analyses in the ACWA and PCD documents are consistent and comparable. The EIS developers need to work together. [*Documents 23-3, 23-4, 30-2, 30-3, 96-24, 101-23, 120-3, 120-4, 120-6, 135-3, 135-4, 135-6*]
Response B-4: While the two EISs were developed independently by two different organizations and were written from different perspectives, coordination meetings that involved the two organizations were held to enable them to share information at several steps in the NEPA process and to promote consistency. However, some inconsistencies remained in the draft documents.

After the comments were received, the two draft documents were reviewed and compared. Some differences between them were found to be inappropriate. These differences (inconsistencies) were addressed through revisions. For instance, the analyses of accidents involving release of agent were revised to make them more consistent.

Other apparent inconsistencies are due to the fact that these two documents were prepared for different proposed actions. Information on the systems being considered for these two actions differs. The ACWA proposed action is to pilot test technology systems at one or more of four installations. The ACWA EIS does not include a comparison of incineration

technology systems with ACWA technology systems or propose to destroy the stockpile of ACWs at any installation. The PCD EIS addresses the construction of an ACW destruction facility that uses a technology system, either incineration or an alternative technology system, to destroy the ACWs at PCD. These different proposed actions mean that the documents are somewhat different.

Comment B-5: The PCD EIS seems to have been written under time pressure, since an adequate level of detail is not provided. The ACWA document provides more detail in the impact assessment. [*Document 40-1*]
Response B-5: Comment is noted.

C COMPARISONS BETWEEN ACWA AND INCINERATION TECHNOLOGIES

Comment C-1: In various documents, comments comparing incineration and the ACWA technologies (Neut/Bio [neutralization/biotreatment], Neut/SCWO [neutralization/supercritical water oxidation], Neut/GPCR/TW-SCWO [neutralization/gas-phase chemical reduction/ transpiring wall SCWO], and Elchem Ox [electrochemical oxidation]) are made. Also, requests for comparisons between ACWA destruction systems and incineration destruction systems are made for various impacts. [*Documents 14-1, 40-4, 40-11, 40-12, 60-1, 62-2, 65-2, 67-1, 67-3, 67-4, 69-2, 77-14, 78-3, 102-4, 109-3, 115-51, 119-33, 119-35]*

Response C-1: The focus of the ACWA EIS is to provide an environmental analysis that will be the basis for selecting ACWA technologies for pilot testing. The decision will not include baseline or modified incineration; consequently, a comparison of ACWA technologies with incineration is not appropriate for this EIS. Although some of the ACWA processes are thermal processes, none are incinerators.

Comment C-2: We recommend that DOD determine the environmental impact differential between the pilot test facility and the Anniston Chemical Demilitarization Facility (ACDF) and Pine Bluff Chemical Demilitarization Facility (PBCDF), which are both under construction. The comparison should document the differences (increases or decreases) in environmental impacts among the anticipated ACDF and PBCDF baseline data, the data from Tooele Chemical Agent Disposal Facility (TOCDF) and Johnson Atoll Chemical Agent Disposal System (JACADS), and the data from alternate technology tests and projections. The impacts (life cycle) should cover air emissions (process and fugitive), solid waste generated and its disposal impact, hazardous waste generated and its disposal impact, energy use (fuel oil, natural gas, gasoline, electricity, etc.), natural and man-made materials used, water discharges and runoff, water use, and ecological impact. The EIS discusses human health and ecological impacts. We recommend that DOD follow the EPA guidance documents, which set a national standard and which were used to support the PBCDF *Resource Conservation and Recovery Act* (RCRA) permit. Then the EIS can determine the differential risk between the PBCDF and the pilot test facility. [*Documents 120-70, 120-72*]

Response C-2: The differential impacts between an incinerator and an ACWA technology system at Anniston Army Depot (ANAD) or Pine Bluff Arsenal (PBA) are not addressed in the ACWA EIS because, as stated in Section 1.3 of the EIS, any ACWA activities would occur in addition to any chemical demilitarization programs and schedules at the stockpile sites; that is, the ACWA pilot facility would not replace an incinerator at ANAD or PBA. The cumulative impacts of operating both an ACWA pilot test facility and an incinerator at ANAD or PBA are discussed in the cumulative impacts section of the ACWA EIS.

D STOCKPILE DESTRUCTION

Comment D-1: In various documents specifically addressed to the ACWA EIS, comments are made both against and in favor of using incineration technology systems for stockpile destruction for a variety of reasons. Comments are also made in favor of using of ACWA technologies for stockpile destruction for a variety of reasons. [*Documents 2-1, 3-1, 5-1, 6-1, 7-1, 8-1, 8-2, 10-4, 11-2, 13-1, 15-1, 15-3, 16-1, 16-2, 17-1, 18-1, 19-1, 19-2, 20-2, 20-3, 21-2, 21-3, 24-1, 24-3, 27-1, 28-2a, 29-8, 32-1, 34-1, 36-2, 37-1, 38-1, 39-1, 39-4, 39-9, 40-2, 40-3, 41-1, 41-2, 41-4, 41-5, 41-8, 43-2, 43-3, 43-5, 44-1, 46-1, 47-1, 48-1, 48-2, 48-3, 49-4, 51-1, 52-1, 53-1, 58-1, 58-2, 58-3, 59-7, 59-8, 59-9, 59-10, 59-14, 60-3, 62-1, 62-10, 62-11, 63-1, 68-1, 69-1, 71-1, 72-5, 73-1, 75-1, 75-2, 75-7, 79-5, 80-1, 81-2, 82-1, 83-1, 84-1, 85-1, 86-1, 87-1, 88-1, 89-1, 91-1, 93-1, 96-4, 96-64, 96-65, 97-1, 97-2, 98-1, 99-1, 100-1, 103-2, 105-1, 106-1, 108-3, 119-1, 122-1, 123-1, 124-1, 125-1, 126-1, 127-1, 128-1, 129-1, 130-1, 131-1, 132-1, 133-1, 134-1, 136-1*]

Response D-1: Comments are noted. However, the ACWA EIS does not address the alternative of constructing and operating a stockpile destruction facility at any site. As its proposed action, the ACWA EIS addresses a pilot testing program. The PMCD is responsible for actual destruction of the ACW stockpile and selection of a destruction technology. When a technology system is selected, the stockpile destruction PMCD will prepare a separate, site-specific EIS, such as the recently published PCD EIS for Pueblo Chemical Depot and the future BGAD EIS for Blue Grass Army Depot. These EISs compare incineration and ACWA technologies. All comments on the ACWA EIS have been forwarded to PMCD so that issues dealing specifically with stockpile destruction can be addressed as part of the response to comments on the PCD EIS.

Comment D-2: In various documents specifically addressed to the ACWA EIS, comments are made that encourage DOD to proceed as expeditiously as possible in destroying chemical weapons safely. [*Documents 16-4, 23-1, 27-5, 50-9, 72-6*]

Response D-2: Comment is noted. However, the ACWA EIS does not address the destruction of the stockpile of ACWs at any installation.

Comment D-3: We would like to protect the environment. The cost to the environment is more than the cost of disposing of the chemical agents. [*Document 32-2*]

Response D-3: Comment is noted. However, the ACWA EIS addresses pilot testing of alternative technologies; it does not address destruction of the ACW stockpile or disposal of chemical agents. Decisions regarding stockpile destruction will be made by PMCD.

Comment D-4: In various documents specifically addressed to the ACWA EIS, comments are made regarding the impacts of incineration technology systems. [*Documents 40-6, 43-2, 47-2, 58-1, 58-2*]

Response D-4: These comments are noted. However, the ACWA EIS does not address the destruction of the stockpile of ACWs at any installation.

Comment D-5: In documents specifically addressed to the ACWA EIS, comments are made that the people of Pueblo have a greater understanding of the issues and impacts discussed in the EIS and that, consequently, they should choose the destruction technology. Comments also state that

there should be some public discussion of the public perception of incineration and any other type of disposal facility to be built in Pueblo. [*Documents 11-1, 11-3, 49-3, 96-9*]
Response D-5: The ACWA EIS does not address the selection of a destruction technology for PCD. Stockpile destruction at PCD is addressed in the PCD EIS.

Comment D-6: I don't think you can get a plant together in time. The EIS should address the throughput and life-cycle schedules, covering the process's ability to meet Chemical Weapons Convention (CWC) completion dates and the resulting impact on the environment. [*Documents 56-30, 102-5*]
Response D-6: The timeline for compliance with the CWC will be a consideration in the final decisions on deployment of a destruction technology. Such a consideration is outside the scope of this EIS. The ACWA EIS addresses the impacts of pilot testing; it does not address stockpile destruction. The impact on the environment of not meeting the CWC schedule is outside the scope of the ACWA EIS.

Comment D-7: Will there also be a baseline incinerator at each of the sites where an ACWA pilot facility is being considered to be located? Would the ACWA facility be located at a site in case an incinerator failed? [*Documents 60-2, 61-1, 64-5, 64-5a*]
Response D-7: At two of the sites, ANAD and PBA, baseline incinerators would also be operating at the time an ACWA technology was being pilot tested. However, whether or not a baseline incineration technology or other incineration technology would be constructed and operated at PCD or BGAD has yet to be decided. That decision will be made by PMCD, which has the responsibility for destroying the existing ACW stockpile.

Comment D-8: The Department of Defense should consider the final end of every weapon they consider. How can it be safely decommissioned and destroyed later? Incorporate that into the planning [*Document 74-5*]
Response D-8: Section 3.3 of the EIS describes the procedures used by the ACWA technologies for handling and destroying ACWs. Disassembly and storage for later destruction do not constitute an alternative for the ACWA EIS. Stockpile destruction is a chemical demilitarization (PMCD) activity. Closure and decommissioning of the ACWA pilot test facility are discussed in Chapter 8 of the ACWA EIS.

E OTHER ISSUES RELATED TO EIS SCOPE

Comment E-1: In the DEIS, there is no information regarding the impacts on agriculture caused by consumers' perceptions of the contamination of agricultural products due to the operation of an ACW destruction technology. Also, there is a cost that results from people moving away because they don't want to be near the facility. [*Documents 43-3, 96-62, 101-6, 109-3*]
Response E-1: An EIS that is prepared according to NEPA requirements has to address potential direct and indirect impacts of the proposed action on the human environment. The public's perceptions or beliefs about other impacts that cannot be identified and analyzed by reasonable scientific techniques are outside the scope of an EIS. In response to other comments on impacts to agriculture, a new subsection on impacts to agriculture has been prepared for each installation. These subsections (4.23, 5.23, 6.23, and 7.23) consolidate information related to agriculture from the DEIS and add additional assessments of the potential impacts of routine emissions from the routine operations of an ACWA facility on livestock and crops.

Comment E-2: The EIS does not address how those affected by agricultural impacts will be compensated or whether there will be a provision for reimbursement if an accident destroys agricultural products. [*Documents 50-4, 50-5, 96-13, 101-6*]
Response E-2: The scope of the EIS is limited to the impacts of the proposed action and alternatives on the human environment. The issue of compensation for impacts is outside the EIS's scope of analysis; however, such issues may be addressed by other aspects of DOD programs related to chemical weapons. PMCD, with the cooperation of PMACWA, is undertaking an agricultural assessment for PCD.

Comment E-3: The EIS needs to discuss what actions will be taken to remediate the igloos that have become contaminated by leaking munitions. [*Document 120-45*]
Response E-3: The management of stored munitions and remediation of igloos are installation actions and not ACWA actions and are beyond the scope of this ACWA EIS.

Comment E-4: The potential synergism and increased costs associated with running two different types of treatment systems (incineration and chemical oxidation) simultaneously need to be considered. DOD has experience in using incineration for the destruction of conventional munitions (e.g., the Kansas Army Ammunition Plant), but implementing other technologies to destroy ACW munitions will require time and effort in order to reach the same safety and operating efficiencies. [*Document 120-43*]
Response E-4: Comment is noted. The cumulative environmental effects of operating an ACWA pilot test facility and an incineration facility are addressed in the EIS. However, a cost analysis of such a scenario is beyond the scope of this EIS.

Comment E-5: Although the PBA stockpile does include some nerve agent munitions, roughly 80% of the stockpile consists of ton containers filled with mustard agent. Therefore, the Parsons/Honeywell neutralization and biotreatment system should still be considered for PBA. [*Document 119-2*]

Response E-5: The ACWA program was established to consider assembled chemical weapons. Ton containers are not included in the definition of assembled chemical weapons and are thus outside the scope of the ACWA EIS.

Comment E-6: It appears that it will be at least 10 years until the ACWA technologies are determined to be potentially viable and consideration can be given to building a full-scale facility. Why should the Anniston community be forced to potentially wait until an ACWA technology is ready and continue dealing with the risk of storing the chemical weapons when a viable, proven process — the baseline incineration process — exists? Does the ACWA program believe that the primary risk to the community is the storage of the chemical weapons? [*Document 22-74*]

Response E-6: As stated in Section 1.3, any ACWA activities would occur simultaneously with any existing chemical demilitarization programs and schedules at the stockpile sites. The incinerator operations at Anniston would not be halted by the construction and operation of an ACWA pilot facility. The EIS assumes that any weapons not destroyed by an ACWA pilot facility at Anniston would be stored only until destroyed by the incinerator at Anniston. The ACWA EIS shows that the greatest potential risks would be from an accident involving stored ACWs.

Comment E-7: How does chemical demilitarization at PCD affect peoples children here, our property, our livelihood, etc. [*Document 16-4*]

Response E-7: Impacts of pilot testing ACWA technology systems are addressed throughout the ACWA EIS. The impacts of ACW stockpile destruction at PCD are addressed in the PMCD EIS.

F EDITORIAL ISSUES

Comment F-1: Various editorial corrections are needed. [*Documents 25-4, 95-25, 96-50, 96-51, 96-52, 120-32*]
Response F-1: Editorial corrections have been included in the FEIS.

Comment F-2: The PCD EIS and ACWA EIS sometimes use different units of measure. Some of the numbers appear to be different due to rounding. [*Documents 23-6, 26-2, 96-15, 96-66, 101-20, 102-1, 106-2*]
Response F-2: The PCD EIS and ACWA EIS were prepared by two different organizations. While environmental assessment descriptions, such as site descriptions, were coordinated, some minor editorial differences in areas such as units of measure and rounding still exist. Each EIS contains a list defining the units of measure used. Unit conversion factors have been added to the FEIS to help the reader compare the two documents. The ACWA EIS provides measurements in both English and metric units.

Comment F-3: The use of the conditional grammatical construction implies doubt, uncertainty, and a lack of information about a process. If process information is limited, a meaningful EIS cannot be written. [*Document 77-9*]
Response F-3: Within the context of an EIS, the use of the conditional construction does not refer to a lack of information or uncertainty about a process. The conditional tense is used in an EIS to describe impacts because a decision to proceed with the proposed action has not yet been made. An EIS evaluates alternatives and compares them before a decision on whether to implement any alternative or continue with no action has been made.

Comment F-4: Referencing in the document is inadequate. The references to the Technical Resource Document (TRD; Kimmell et al. 2001) should include the volume, section, and page numbers. [*Document 77-2]*
Response F-4: The method of referencing used in the ACWA EIS follows standard practice. Each volume in the TRD refers to a specific installation, and each volume is organized according to technology, which should help the reader find information in the document. It is standard practice in EISs not to include page numbers for citations unless text is actually being quoted. Because of the large number of sources and the widely diverse audience for EISs, providing page numbers for every citation would be impractical and distracting. Moreover, in order to compile the data they need for their analyses, the researchers who are gathering information for the EIS often obtain it from a number of sections within a single source. Interested readers can contact the author or organization responsible for the source to obtain details, if needed.

Comment F-5: Presentations related to the EIS have used the word “complexity.” The meanings of this word are varied. Please avoid this word in favor of more specific language. Presentations have also used the term “lessons learned.” [*Document 9-1*]
Response F-5: The ACWA EIS was searched for the words “complexity” and “lessons learned.” In the document, the word “complexity” is used in a manner consistent with lay usage and standard dictionary definitions to mean “consisting of many related elements or parts.” The word complexity is used in the EIS to describe installation functions, chemical reactions, and

groundwater flow. No qualities of system behavior are implied by the use of this term. The term "lessons learned" is not used in the ACWA EIS.

G PREFERENCES

Comment G-1: It would be preferred to not build an ACWA pilot test facility. [*Documents 57-2, 62-5, 62-12*]
Response G-1: Comment is noted.

H SUMMARY

Comment H-1: The term "exceeds the standard" should be explained so that it will be understood. [*Document 26-1*]
Response H-1: The summary has been revised to explain what this term means.

Comment H-2: The summary tables are useful but they don't contain the same information across the sites. Greater consistency of information would make the tables more useful for comparisons. An additional table that compares different sites for each technology would also be helpful. [*Document 42-1*]
Response H-2: The summary tables have been revised to include greater consistency across sites. However, it is not appropriate to compare installations for each technology. In the ACWA EIS, decisions for each installation are made on an individual basis. PMACWA does not consider installations as being alternatives to each other. A decision on whether to pilot test will be made for each installation.

I PURPOSE AND NEED

Comment I-1: In the National Research Council (1999) report entitled *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons*, General Finding 14 under "Summary, Findings and Recommendations" states, "It is unlikely that any of the technology packages could meet this deadline" (meaning the current deadline). Do you agree with this statement? Can ACWA meet the treaty deadline, given that the technologies are so immature? According to the National Research Council, it isn't possible. How do you dispute this? [*Documents 22-69, 56-30*]

Response I-1: The requirement for completion of U.S. stockpile destruction on April 29, 2007, with a possible extension to April 29, 2012, is stated in Section 1.2 of the ACWA EIS. Section 2.3 notes that the earliest date for ACWA pilot tests and system checks to begin is January 2006. The ability of a post-pilot ACWA facility to meet the requirements of the CWC is outside of the scope of this EIS, but it will be a consideration in any proposal to design, construct, and operate an ACWA facility for stockpile destruction.

J ALTERNATIVES

Comment J-1: I understand that Congress passed a law that requires a consideration of alternatives, and in the law are pretty high standards that have to be met. My understanding is that ACWA has found technologies that meet those standards. [*Document 29-9*]
Response J-1: The ACWA selection process is outlined in Section 2.4.

Comment J-2: Can technologies other than those addressed in the EIS be considered, such as super-ionized water, plasma arc, or the Flura Chemical incineration system? [*Documents 28-1, 28-2, 79-4, 120-49*]
Response J-2: No. New technologies continue to develop, and the selection process had to be ended at some point to allow the evaluation of technology systems. The selection process is described in Section 2.4 of the EIS.

Comment J-3: The discussion in the DEIS appears to be inconsistent in terms of whether electrochemical oxidation is being considered as a technology. [*Document 77-6*]
Response J-3: Elchem Ox is considered for ANAD, PBA, and BGAD but not for PCD. This technology is not assessed for Pueblo on the basis of Public Law 106-398, which limits the technologies to be considered at Pueblo to those demonstrated by ACWA on or before May 1, 2000.

Comment J-4: Was neutralization approved for Anniston? What is its status? Is it viable? [*Documents 54-1, 54-2*]
Response J-4: Technology systems that include neutralization processes are being considered as alternatives for ANAD in the ACWA EIS. The EIS discusses the status of the technologies and assesses potential impacts on the human environment. No decision has yet been made to pilot test ACWA technologies at any installation. The four technologies that completed demonstration testing are considered to be viable candidates for pilot testing. That decision will occur when a Record of Decision is published in the *Federal Register*.

Comment J-5: The projected date for the completion of incineration at Umatilla and Tooele was incorrect; consequently, consideration of these installations should have been included in the EIS. [*Documents 113-1, 113-2, 117-1, 118-1*]
Response J-5: Schedules are under review in this ACWA EIS. The rationale for inclusion of installations is discussed in Section 2.3. DOD has made no decision to change the list of installations included.

Comment J-6: For ANAD and BGAD, the neutralization/biological pilot treatment system appears to be a null alternative since this technique will not work for nerve agents. What would be used for the other ACWs? Of the remaining alternatives, neutralization/supercritical water oxidation appears to offer more efficient conversions. However, there are other forms of neutralization/chemical oxidation that may not be as difficult to “maintain”; that is, the supercritical fluids in question are a dense gas medium that is maintained above its critical temperature (the temperature above which it will not liquefy by pressure). Failure to maintain

this critical temperature would potentially disrupt treatment operations and efficiencies. [*Documents 22-5, 56-1, 120-46*]

Response J-6: There are mustard-filled munitions at ANAD and BGAD that would allow the pilot testing of a Neut/Bio treatment system. The comment regarding SCWO is noted, but the SCWO technology successfully passed the ACWA technology demonstration and is an alternative, as outlined in Section 2.4.

Comment J-7: Why would ACWA not build a test facility somewhere in the desert or some other remote area instead of in Anniston, Alabama? Why are ACWA technologies not being held to the same standards as the baseline incineration process by requiring the construction of a full-scale plant somewhere outside the continental United States to prove the technology? [*Documents 22-75, 59-2, 59-3, 59-11*]

Response J-7: Sites were chosen on the basis of an analysis of what locations would have ACWs available at the time a pilot test facility would begin testing. Schedules available to ACWA at the time of preparation of the ACWA EIS indicated that no site located in the desert would have any ACWs available. Although these schedules are under review, DOD has made no decision to change the list of installations included in this ACWA EIS. Federal laws prohibit the transport of the chemical weapon stockpiles across state lines.

Comment J-8: Why can't ACWs be transported to another site for destruction, such as Dugway Proving Ground? [*Document 59-4*]

Response J-8: Current laws prohibit the transport of chemical weapon stockpiles across state lines.

Comment J-9: Does Anniston have ACWs that do not exist at other sites? [*Document 59-5, 59-6*]

Response J-9: Yes, each installation has a somewhat different mix of ACWs.

Comment J-10: Except with regard to physical size, information on the siting criteria for the alternative areas for test facility construction is inadequate. We assume DOD will prepare site-specific EISs. [*Document 120-42*]

Response J-10: For each of the four installations, potential sites were based on the siting considerations that the Army had originally used in EISs or prepublication documents related to incineration. These same sites were considered (if still available and appropriate) for an ACWA facility. The two Army selection criteria were as follows: (1) U.S. Army safety regulations establishing minimum distances between activities involving munitions would be upheld. (2) Current activities would not be suspended, relocated, or terminated to allow disposal operations to occur at any given location, unless such action was clearly warranted to protect public health and safety. Army regulations for explosive safety are given in AMC-R 385-100, which establishes standards for the safe handling and storage of explosive munitions. "Safety distance" is the distance that must separate a new facility from existing facilities or installation boundaries. The criteria used at each of the installations are described in more detail in Sections 4.1.1, 5.1.1, 6.1.1, and 7.1.1.

Comment J-11: At ANAD, the storage of weapons should decrease as the incinerator operates. Why don't the impacts under the no action alternative reflect this situation? [*Document 22-2*]

Response J-11: The ACWA EIS defines no action for ANAD as to not construct an ACWA facility and to store the part of the inventory that might have been used for pilot testing until it is destroyed by incineration. The no action analysis only looks at the impacts of continued storage. During continued storage, the consequences of an accident do not depend on how many igloos are used for storage. The impacts associated with destruction using incineration (if no ACWA facility is constructed) are addressed in the *Final Environmental Impact Statement for Disposal of Chemical Agents and Munitions Stored at Anniston Army Depot, Anniston, Alabama,* (U.S. Army 1991) and are not repeated in this document.

Comment J-12: Proposed Area B at ANAD appears to be superior to others in several ways. The FEIS needs to generally discuss the preferred location so that impacts associated with extending infrastructure can be examined further. We assume DOD will prepare site-specific NEPA documentation to more thoroughly address detailed site-specific issues, such as wastewater treatment and impacts of wastewater discharges. [*Document 120-44*]

Response J-12: Your comments on the comparative environmental characteristics of potential facility locations at ANAD are noted. Although the ACWA FEIS identifies a preferred alternative, DOD at this time has not identified a preferred location for an ACWA facility. A location within any installation for an ACWA pilot test facility will not be selected until after the Record of Decision, in which DOD will announce whether, where, and with what technology pilot tests will be conducted. Further evaluations of infrastructure requirements and emissions are being conducted as part of the ongoing engineering design basis and permitting studies.

Comment J-13: Section 4.4.3.2 does not consider that continued storage of chemical weapons at ANAD would result in continued risk of storage. [*Document 22-50*]

Response J-13: The referenced section on waste management addresses routine wastes generated during no action, which would include continued storage of chemical weapons until they were destroyed in accordance with the CWC. The risks of storing ACWs are addressed in the section of the ACWA EIS that addresses accidents involving ACWs (Section 4.21).

K ACWA TECHNOLOGY SYSTEMS

K1 DOCUMENTS AND REFERENCES

Comment K1-1: The TRD should be made an integral part of the EIS. Appendices summarizing operational effluents should be included, emphasizing the composition of effluent gases. [*Documents 77-3, 77-12*]
Response K1-1: The TRD (Kimmell et al. 2001) is a reference document designed to provide details on ACWA technology systems beyond the information needed for the EIS. The TRD is available in reading rooms and to the public upon request. Section 3 of the EIS provides a description of each of the technologies and information on the operational inputs required. Detailed information on emissions, including operational emissions, that could result from each technology at an installation are located in the individual installation chapters.

Comment K1-2: A complete review of the ACWA DEIS would require a review of the Mitretek documents and others. Summaries of all these data should be incorporated in the ACWA EIS. [*Document 77-4*]
Response K1-2: The documents referenced in the DEIS, including those with the technology information generated by Mitretek, are available to the public upon request to PMACWA.

Comment K1-3: When will additional technical reports on ACWA be available? Will they be available before any decisions are made? [*Documents 56-34, 56-35*]
Response K1-3: The following reports are available to the public from the document authors:

- Program Manager for Assembled Chemical Weapons Assessment, 2001, *Assembled Chemical Weapons Assessment Program, Supplemental Report to Congress*, U.S. Department of Defense, PMACWA, Aberdeen Proving Ground, Md., June.
- National Research Council, 2001, *Analysis of Engineering Design Studies for Demilitarization of Assembled Chemical Weapons at Pueblo Chemical Depot*, Committee on Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons, prepared by National Research Council, Washington, D.C., published by National Academy Press, Washington, D.C., Aug.

Comment K1-4: The document is terribly inadequate, leaving out key information. Was this done by design to further the pursuit of ACWA technologies? [*Document 22-45*]
Response K1-4: The ACWA technologies are under development and ready for pilot testing. In addition, detailed engineering design is just getting underway. For these reasons, the technologies are less mature, and fewer details are known about their final design, than is the case for facilities with operational technologies, such as baseline incineration facilities. More details on ACWA technologies can be found in the TRD (Kimmell et al. 2001), which is available to the public upon request to PMACWA. The TRD was prepared specifically to provide more detailed information for the ACWA EIS than was otherwise available to the public.

K2 ASSUMPTIONS

Comment K2-1: The assumptions used for making estimates need to be clearly stated in the EIS. For comparison purposes, the assumptions that apply to all technologies must be identified. [*Document 95-8*]
Response K2-1: Throughout the EIS, the assumptions used for impact assessment are identified. The basis for estimating emissions, discharges, and wastes are provided in the TRD (Kimmell et al. 2001) for each technology. Whenever it was reasonable and possible, care was taken to use consistent assumptions for the impact assessments for the four ACWA technologies.

K3 MATURITY OF ACWA TECHNOLOGIES

Comment K3-1: Information resulting from progress in containment design achieved during the engineering design studies (EDSs) should be included in the ACWA FEIS. The EIS should reference all additional data gathered through additional demonstrations and EDSs. [*Documents 108-25, 115-37, 119-27, 120-62*]
Response K3-1: Engineering design for the ACWA technology systems continues. In order to progress with an EIS, all information related to process design had to be fixed at a certain point; it was fixed after the technology demonstration but before the availability of certain reports on the engineering design basis. For the purpose of this NEPA analysis comparing technologies and installations, the information from the technology demonstration was considered to provide an adequate basis for comparison of the alternatives.

Comment K3-2: Shouldn't you figure out whether the technologies would work before a pilot test facility is built? How will you know what your output will be? Have the ACWA technologies been demonstrated and operated safely? [*Documents 56-37, 57-1, 61-2, 62-2*]
Response K3-2: ACWA is doing just that in the systematization studies, which study how everything works together and performance specifications. In addition, ACWA staff members meet with regulators to determine what the compliance requirements are and to ensure that the compliance requirements will be met. The ACWA technologies have been successfully demonstrated at Deseret Chemical Depot in Utah, Dugway Proving Ground in Utah, Aberdeen Proving Ground in Maryland, and a number of locations throughout the United States.

Comment: K3-3: The ACWA technologies are not mature enough to undergo pilot testing. Why should we have something unproven and untested when incineration is a proven technology? The processes will never work. [*Documents 1-2, 7-2, 20-1, 20-4, 29-15, 56-3, 56-6, 56-32, 56-33, 77-13, 77-17*]
Response K3-3: The four ACWA technologies have successfully undergone demonstration testing. More detailed EDSs are currently being done in preparation for pilot testing the technologies that are selected. The ACWA program is dedicated to developing technologies for the destruction of ACWs in a timely manner to meet mandated deadlines for destruction of the U.S. ACW stockpile. Of the four technologies under consideration as alternatives to incineration, not all necessarily will be piloted. The maturity of the technology systems was considered in selecting the alternatives, as described in Section 2 of the EIS. Note that a number of the ACWA

processes, such as neutralization, have been used in the past in the destruction of chemical weapons. Other ACWA technologies have been used in industry. See Chapter 3 of the EIS.

Comment K3-4: There are issues of technological maturity to consider on the basis of the National Research Council's findings in 1999 concerning treatment of energetic materials, including trinitrotoluene (TNT). Do these findings mean that not only are these technologies immature relative to destroying agent on a full scale, but they are also not even capable of destroying the energetics in the chemical agent munitions? Isn't this situation dangerous? Why do you want to test an unproven process that is dangerous? [*Documents 22-57, 22-58, 56-18, 56-19, 56-20*]

Response K3-4: The referenced National Research Council report, *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons,* was published in 1999, before the completion of the ACWA demonstrations. The destruction of energetics by ACWA systems was demonstrated during the ACWA demonstrations. These demonstrations are addressed in the EIS and TRD (Kimmell et al. 2001). During the EDSs, a full-scale energetic hydrolysis system was installed and operated in order to address the earlier concern of the National Research Council. The ACWA program has successfully destroyed, through hydrolysis, a total of more than 6,000 lb of explosives and nearly 8,000 lb of propellants.

Also, see other reports, including *Evaluation of Demonstration Test Results of Alternative Technologies for Demilitarization of Assembled Chemical Weapons — A Supplemental Review*, published by the National Research Council in 2000. This report states the following on p. 27: "The Army and General Atomics have acknowledged that more work needs to be done before the hydrolysis of energetics can be considered safe and effective at production-scale levels. The demonstration tests provided a large body of data. The Army has assembled a team of agencies to analyze the preliminary results, assess the efficacy of the processes, and identify problems and their causes and effects. Further experimentation is also being planned."

The report entitled *Supplemental Report to Congress, June 2001* (PMACWA 2001) states the following on p. vi: "These four demonstrations have utilized technologies of neutralization/ supercritical water oxidation, neutralization/bioremediation, neutralization/transpiring wall supercritical water oxidation/gas phase chemical reduction, and electrochemical processes to destroy chemical agents, explosives, propellant, and related materials ('dunnage' including wood, fiberglass, rubber, PCBs, and metal parts). As reported in the technical sections of this report, chemical agents were destroyed by these technologies to 'six nines,' that is, to 99.9999%; energetics were destroyed to 99.999%, also meeting performance objectives."

Neutralization, followed by secondary treatment using biotreatment or SCWO, is capable of destroying energetics to 99.999%. After demonstration testing, the proposed ACWA technologies are being carried forward into EDSs that address additional testing and engineering scale-up. These studies are identified in the ACWA EIS and the TRD. The EIS concludes that the processes, including destruction of energetics, can operate safely.

Comment K3-5: Page 3-19 of the ACWA DEIS states in its discussion of SCWO that the "potential for long-term operability. . .has not been demonstrated," "issues associated with plugging and corrosion. . .have not been addressed," and "reactor technology issues. . .remain to be resolved." This description implies a process that is in its infancy. It is not possible to write a safety evaluation for such a plant that is processing hazardous materials at 705ºF and 3,400 psia when all of these safety-related issues remain unresolved. [*Document 77-8*]

Response K3-5: The SCWO process should not be characterized as a process in its infancy. The initial ACWA demonstrations have shown that chemical agents were destroyed by this technology, coupled with agent neutralization to "six nines" (i.e., 99.9999%). Energetics were destroyed to 99.999%, a result which also meets performance objectives.

The Neut/SCWO technology demonstration in fiscal year 1999 was carried forward into EDS I to address additional testing and engineering scale-up in 2000. During this testing, the SCWO logged nearly 4,000 hours of operation with a feed representative of the chemical stockpile. One objective of the EDS was to develop a preliminary hazards analysis; this has been completed. A second year of technology testing has been implemented to resolve key questions on the optimal material choice, throughput rates, operating parameters, chemical balances, effluent characterization, and other related issues that normally arise in engineering designs. While some of these issues will continue to be refined as more technology development takes place, the refinements should not be construed as indicating immaturity in technology development. The baseline incinerator design, for example, continues to undergo thousands of engineering changes, yet it is over a decade since it was first constructed on Johnston Atoll. The EIS concludes that the process can operate safely.

Comment K3-6: The National Research Council (1999) report entitled *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons* and the National Research Council (2000) report entitled *Evaluation of Demonstration Test Results of Alternative Technologies for Demilitarization of Assembled Chemical Weapons — A Supplemental Review* state:

- Testing, verification, and integration beyond the 1999 demonstration phase will be necessary.
- Substantial additional testing, verification, and integration should be performed prior to full-scale implementation.
- The ACWA demonstrations tested only unit operations that DOD considered most critical or least proven.
- Demonstration did not include interfacing the unit operations into a complete integrated system.
- Waste streams contain very small amounts of hazardous substances that have not been fully characterized.

Isn't it fair to say that these technologies have only had limited testing and have not been fully tested for all operations or integrated into full-scale production processes? What is the danger, given the above is true, and what risk does it present for the community? [*Documents 22-32, 22-60, 22-61, 22-63, 22-65, 22-67, 22-71, 22-72, 56-22, 56-23, 56-24, 56-26, 56-28*]

Response K3-6: Since the 1999 National Research Council report, further demonstration and testing has occurred and is summarized in the following reports, which are available from the document authors. These documents report the continuing development of the ACWA

technologies. These documents also provide waste characterizations that were considered in the EIS analysis.

- Program Manager for Assembled Chemical Weapons Assessment, 2001, *Assembled Chemical Weapons Assessment Program, Supplemental Report to Congress*, U.S. Department of Defense, PMACWA, Aberdeen Proving Ground, Md., June.
- National Research Council, 2001, *Analysis of Engineering Design Studies for Demilitarization of Assembled Chemical Weapons at Pueblo Chemical Depot*, Committee on Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons, Washington, D.C., published by National Academy Press, Washington, D.C., Aug.

The purpose of the pilot testing of ACWA technology systems addressed in the ACWA EIS is to provide tests of the system integration mentioned in the comment. To address uncertainties regarding the performance of the integrated systems and the maturity of the technology, the EIS uses conservative (i.e., higher) estimates of emissions and operational requirements in the analysis in order to bound uncertainties. The EIS addresses the hazards of an ACWA pilot facility. The EIS addresses the pilot-scale testing of an ACWA facility up to full-scale size.

Comment K3-7: In the National Research Council (1999) report entitled *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons,* General Finding 10 in "Summary, Findings, and Recommendations" states that "impurities that are not detected in small-scale tests may be evident in larger scale tests. Because of the limited quantities used in the small-scale and demonstration-phase tests, trace impurities in the waste streams may not be detectable." Isn't this indicative of an immature process? What are these impurities? What is the impact of these impurities on human health and the environment? [*Documents 22-68, 56-29*]

Response K3-7: The National Research Council finding is a statement of fact applicable to any full-scale facility that emits large, dilute waste streams. The ACWA demonstrations (Response K3-4 lists citations with the results of these demonstrations) were designed to look for a number of chemicals at extremely low levels to ensure to the detection of emissions that could potentially occur at larger scales. In addition, some of the ACWA processes tested during the technology demonstrations were at or near the scale that would be used in an ACWA pilot facility. The estimates used in the EIS, which were based on the ACWA demonstrations, are conservative with regard to health, safety, and environmental protection. The ACWA EIS contains an assessment of the impacts of toxic air pollutants emitted at very low concentrations; impacts were found to be very low.

Comment K3-8: A quantitative risk assessment, health risk assessment, and ecological risk assessment cannot be conducted at this state of technology development. These assessments will have to be conducted in the future. [*Document 56-25*]

Response K3-8: Comment is noted. However, the EIS presents an assessment of health risk and ecological risk that is based on the information and the state of technology development available at the time the EIS was prepared. Where appropriate, additional assessments will be prepared in conjunction with environmental permit development.

Comment K3-9: In the National Research Council (2000) report entitled *Evaluation of Demonstration Test Results of Alternative Technologies for Demilitarization of Assembled Chemical Weapons — A Supplemental Review,* Recommendation GA-4 states, "The efficacy and safety of the additional step to remove aluminum hydroxide from the hydrolysate produced from rocket propellants should be evaluated prior to construction of a full-scale supercritical water oxidation system." This statement indicates that this technology is not proven. Has this recommendation been pursued? What were the results? Doesn't this statement indicate that the National Research Council is concerned that this process may not be safe? [*Document 22-70, 56-31*]
Response K3-9: The National Research Council recommendations were incorporated in the ACWA EDSs and have since been demonstrated. See Response K3-4 for more recent references regarding demonstration. The ACWA EIS concludes that the technologies could operate safely.

Comment K3-10: Throughout the EIS, the proposed facility is referred to as a demonstration facility. This is also stated in the National Research Council report in various places. This means that the proposed technologies are not proven. Why would you even want to consider building a "test facility" using an unproven technology in Anniston, Alabama, where 70,000 people are located? [*Documents 22-32, 22-71, 22-72*]
Response K3-10: The alternative technologies considered in the EIS have undergone demonstration testing. The proposed action is to pilot test these technologies in a full ACW destruction system. The ACWs needed to pilot test an ACWA facility are potentially available at ANAD, as stated in the EIS. The decision of where to locate an ACWA facility will take a number of factors into consideration.

Comment K3-11: The ACWA program has prided itself on its supposed Dialogue. It appears that the ACWA program has not been totally up front with the public regarding the efficacy and maturity of the ACWA technologies. Is this by design? When do you intend to make the public fully aware of all the shortcomings of the ACWA technologies? [*Document 22-73*]
Response K3-11: The ACWA EIS acknowledges the level of efficacy and maturity of the ACWA systems. Various documents discussing the development and maturity of the ACWA systems are referenced in the ACWA EIS. PMACWA maintains an ongoing discussion regarding the development of these technologies through the Dialogue.

K4 FACILITY SIZE

Comment K4-1: The term "pilot plant" is misleading if a full-sized plant is what is being analyzed. The use of the term "pilot" also implies the future intent to scale up for production. [*Documents 29-5, 77-1, 77-5*]
Response K4-1: While each agent destruction technology has been technically demonstrated, the total ACWA integrated destruction system has not been demonstrated. The ACWA pilot facility will be used to do this demonstration. The ACWA EIS assumes a full-sized facility processing at a full rate. Use of these parameters allows a reasonable assessment of the types of impacts that might occur.

Comment K4-2: The document needs to include an analysis of the impact of full-scale operation in addition to the impact of the pilot phase. [*Document 40-10*]
Response K4-2: The ACWA EIS looks at the annualized impacts of pilot testing a full-scale facility at design throughput for 36 months. By bounding the operational analysis in this way, it is possible to determine, on an annual basis, the impacts that might result if operations approach those of an operational full-scale plant. If and when an ACWA technology is proposed for final destruction of the ACWA inventory, further environmental analysis would be conducted, if necessary.

K5 SCHEDULE

Comment K5-1: Inventory should not be held back from destruction at Pine Bluff just to test an ACWA system. [*Documents 78-1, 78-4*]
Response K5-1: Comment is noted. An ACWA pilot facility will not interfere with weapons destruction.

Comment K5-2: How long will it take to get a facility built? How long will the pilot tests take? How long would it take the ACWA alternatives to get rid of the ACWs? [*Documents 61-4, 61-6*]
Response K5-2: It would take about one to two years for final design and permitting of an ACWA pilot test facility. Construction would take about 34 months. The proposed action for the ACWA EIS is to pilot test the ACWA technology systems. The EIS assumes that a pilot test would take up to three years. The actual pilot test period could be shorter. It is not the purpose of ACWA pilot test facilities to complete full chemical demilitarization at any site. The ACWA EIS does not address how long it would take to destroy the stockpile at any installation. The PMCD will determine how to completely destroy any installation's stockpile of ACWs. One of the results of a pilot test of ACWA technology systems would be to make these technologies available as alternatives to chemical demilitarization.

Comment K5-3: DOD should provide the schedule for the pilot test facility, detailing the major steps. The steps may include all permit applications submitted, all permits issued, construction started, construction complete, testing phase, operational phase, and closure. [*Document 120-80*]
Response K5-3: A general statement of the pilot facility schedule has been added to Section 2.2. Detailed schedules for the pilot test facility will not be developed until after decisions are made regarding the number of facilities, types of systems, and locations of the ACWA pilot facility.

Comment K5-4: It would take longer for Neut/Bio technology to do the job. [*Document 23-2*]
Response K5-4: The pilot test is assumed to operate 12 hours per shift, 6 days per week, and 46 weeks per year. Further information on the schedule can be found in the TRD (Kimmell et al. 2001). The ACWA EIS does not address the duration of stockpile destruction by different technologies.

K6 SYSTEM ELEMENTS

Comment K6-1: DOD should address the situations in which the weapons are not in original or good condition (agents that have reacted in the containers, such as jellied liquid, liquid under pressure, pH changes, deterioration of explosives). [*Document 120-79*]
Response K6-1: The ACWA technology systems as analyzed in the ACWA EIS for the proposed action take into account the various conditions of the ACWs in the stockpile. This issue is addressed further in the TRD (Kimmell et al. 2001).

Comment K6-2: The Neut/SCWO technology may not neutralize GB very efficiently; thus, incomplete oxidation may result. The chemistry and physics of the Neut/SCWO technology need to be more fully explained. [*Document 120-49*]
Response K6-2: The ability of the Neut/SCWO technology to destroy GB was verified in the ACWA technology demonstrations of two different Neut/SCWO systems. Both the PMACWA and the National Research Council have done extensive reviews of the Neut/SCWO technology.

Comment K6-3: Does the EIS address the dunnage, metals, or solids after the process is over? [*Document 66-1*]
Response K6-3: The ACWA EIS addresses the treatment of dunnage and metal parts and the disposal of wastes and materials at the end of the process.

Comment K6-4: Are the ACWA processes closed-loop processes? [*Document 56-11*]
Response K6-4: A closed-loop system is generally considered to be one that is completely self-sufficient, in which process effluents are recovered and/or recycled. The ACWA technologies considered in the DEIS are not closed-loop processes, because effluents and wastes are generated.

Comment K6-5: Does the Neut/SCWO facility have a laboratory, or has it been left out? [*Document 22-18*]
Response K6-5*:* All ACWA technology systems have a laboratory. This fact was taken into account in the calculation of emission rates and waste generation for all technology systems. In some cases, such as Neut/SCWO, emissions from the laboratory are combined with other waste streams.

Comment K6-6: Thermal treatment is used in the ACWA systems. Other elements appear similar. Isn't thermal treatment incineration? [*Documents 22-44, 56-9, 56-13, 58-4, 59-15*]
Response K6-6: ACWA systems do use thermal treatment, which typically involves exposing metal parts to high temperatures to ensure that all chemical agents are destroyed. The ACWA systems achieve these high temperatures by means other than by open flame (i.e., incineration), including steam, radiant heat, and high-temperature gases.

Comment K6-7: Supercritical conditions imply scary conditions. SCWO operates at high pressures and high temperatures. These are dangerous conditions. Is there a risk of explosion with SCWO? Is there a chance the Elchem Ox process will explode? Will chemicals such as

nitric acid be released? Is there a risk of explosion from energetic materials? What are the impacts of an explosion? [*Documents 22-43, 56-7, 56-8, 56-12, 59-12, 59-13*]

Response K6-7: The word "supercritical" (in terms of SCWO technologies) means above the critical point of water (the temperature and pressure at which the physical properties of water's liquid and gaseous states are identical). Supercritical does not imply that conditions in the facility are "critical." The hazards associated with SCWO and other ACWA processes were considered in the analyses. SCWO and most of the other ACWA processes are in commercial use and have a proven safety record with regard to the danger of fire and explosion. High-pressure and high-temperature systems do require safety to be considered to ensure that designs will assure protection for the workers and the environment. These systems are also operated remotely to minimize hazards. There is also some hazard associated with energetics, but such operations are conducted remotely and contained in structures designed to mitigate the danger.

Comment K6-8: Page 3-10, line 26 of the ACWA DEIS indicates that platinum liners are utilized in the SCWO units associated with the Neut/SCWO process. It was our understanding from the EDS testing done under the ACWA program that the platinum liners had proved unsuccessful and had been replaced with titanium liner. [*Documents 42-2, 120-66*]

Response K6-8: The statement regarding the use of platinum has been changed to "the proposed design includes reactor vessels with a liner constructed of a corrosion-resistant metal, such as platinum." The liner used during the ACWA demonstration was hastelloy (a steel alloy). Titanium and platinum liners have been tested during EDSs to determine the cost versus the life of the liner materials.

Comment K6-9: For large-scale decontamination projects, the U.S. Army Edgewood Research, Development and Engineering Center (Material Safety Data Sheet [MSDS] of February 14, 1994) recommends both HTH (bleach or sodium hypochlorite) and sodium hydroxide for VX oxidation and hydrolysis. Is DOD investigating other chemical neutralization and oxidation processes that are more efficient and easier to maintain during a protracted treatment project? [*Document 120-47*]

Response K6-9: The MSDS for VX (http://in1.apgea.army.mil/RDA/msds/vx.htm) states, "The large scale decon procedure, which uses both HTH and NaOH, destroys VX by oxidation and hydrolysis." It also states, "The detoxified VX (using procedures above) can be thermally destroyed in an EPA approved incinerator according to appropriate provisions of Federal, State, or local Resource Conservation and Recovery Act (RCRA) regulations." The approach outlined in the comment refers to decontaminating dispersed chemical agent, with the by-products destroyed by incineration, which is the baseline technology for ACWs.

A detailed description of potential agent neutralization options is provided in Appendix D of the National Research Council (1999) report entitled *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons.* This appendix indicates that agent neutralization generally utilizes either sodium hydroxide (NaOH) or potassium hydroxide (KOH). Three of the ACWA technologies use sodium hydroxide during chemical agent neutralization. Page 29 of this document also states, "Hydrolysis of agent (used in the General Atomics and Parsons-Allied Signal technology packages) appears sufficiently mature to consider full scale application to any assembled chemical weapons."

The neutralization process proposed in the ACWA technologies has been validated effective to 99.9999% destruction efficiency for all agents and to 99.999% destruction efficiency

for all energetics as part of the most recent demonstration of the Neut/GPCR/TW-SCWO technology and previous demonstrations of the Neut/Bio and Neut/SCWO technologies.

Given all the above information, the current neutralization process is considered appropriate for full-scale application.

Comment K6-10: Similar to VX, HD and HT will hydrolyze and can then be oxidized with a common reactant (i.e., diluted [35%] hydrogen peroxide). Hydrogen peroxide is a cleaner oxidizer, and its by-products do not form intermediary chlorine compounds. It can be very concentrated or kept diluted, and it is very efficient at oxidizing organic compounds of this class. An important feature is that its wastewater streams would possess fewer salts than those resulting from use of other standard oxidizers. [*Document 120-48*]
Response K6-10: The ACWA program evaluated and demonstrated those technologies proposed at the onset of the program to be able to destroy ACWs. The destruction of mustard by using hydrogen peroxide was not proposed and was therefore not tested.

Comment K6-11: Page 4-33 of the ACWA DEIS does not provide sufficient detail on how mustard agent would be neutralized with hot water followed by caustic (NaOH) solution to prevent agent reformation. DOD proposes that mustard agent would reform during the treatment process. The chemistry of this reformation is not elaborated upon in the EIS. If mustard agent reformation is a potential problem during this treatment process, the FEIS should provide specific details on how this reformation would occur, what measures would be taken to quantify this reaction, and how fugitive emissions would be controlled. The need to quantify this reformation is important in order to determine the amount of reagents required for the neutralization. The FEIS should provide more specific details on how this reformation of mustard gas would be quantified (e.g., how much, how often, what cost) during the treatment process. [*Document 120-52*]
Response K6-11: That is incorrect and the referenced statement will be revised to be clearer. Reformation of mustard during hydrolysis is not significant, although the potential for agent reformation exists during hydrolysis of GB. Because GB has been shown to reform at a pH below 13 (see Appendix D of the document entitled *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons* published by the National Research Council in 1999), excess caustic is used throughout the hydrolysis process to prevent reformation of agent.

Comment K6-12: With regard to p. 4-34 of the ACWA DEIS, how is the "heated oven" heated in the GPCR thermal reduction batch process (TRBP)? What temperature does this oven reach? [*Document 22-13*]
Response K6-12: Decontamination of process stream metal parts is accomplished in the TRBP, where the parts are subjected to high temperatures to mobilize organic contaminants and heat inorganics to 5X criteria. Heat for organic waste vaporization is supplied to the TRBP from external shell fireboxes fired with either GPCR product gas or fuel gas. Toward the end of the organics vaporization period, the TRBP is heated up to approximately 600°C over a one-hour period and held for at least 30 minutes to guarantee that 5X conditions are satisfied.

Comment K6-13: With regard to p. 4-35 of the ACWA DEIS, what is a detonation chamber? Are there any emissions from these detonation chambers? Are the energetics fed directly to the metal parts treater (MPT)? [*Document 22-14*]
Response K6-13: Fuses and supplemental charges will be conveyed to the detonation chambers for deactivation. The detonation chambers considered in the Elchem Ox technology are stated by the technology proponent to be Donavon blast chambers (DBCs), which consist of a blast chamber, an expansion chamber, and a filtering system. Modeled after the principles of a rifle silencer, the chambers can detonate explosives or similar materials without the residue escaping into the soil, air, or water. The fuses and supplemental charges, which are wrapped in an explosive blanket, are blown up within the chamber, thereby controlling the heat, shrapnel, and noise. An air filtration system captures particulates 0.5 μm or larger in size. Exhaust from this operation is treated through the catalytic oxidation unit.

The technology proponent proposes using a SILVER II electrochemical oxidation unit for energetics destruction. As such, energetics would not be fed directly into the MPT.

Comment K6-14: Page 4-35 in the ACWA DEIS indicates that Elchem Ox technology uses nitric acid. Isn't this a very corrosive material? What is the impact on the environment from using this material? What if nitric acid was released? Wouldn't there be a plume? [*Document 22-48*]
Response K6-14: Nitric acid is a corrosive material. Relatively small quantities of nitric acid (on the order of a single rail car) are estimated to be consumed annually by the Elchem Ox technology. Because stringent measures will be enforced during the storage and transfer of nitric acid, the impact on the environment is expected to be minimal during normal operations. A release of nitric acid in liquid form would first be contained, then neutralized with 20% sodium bicarbonate solution or a similar compound, and then absorbed with inert material (for a small spill). An airborne plume would not be expected to be generated.

Comment K6-15: Page 4-35 in the ACWA DEIS states, "Metal parts from detonation chambers, munitions hardware, dunnage, and other solid wastes would be thermally decontaminated to a 5X condition in the MPT, an inductively heated vessel with a superheated steam reactive environment." Isn't this incineration by another name? [*Documents 22-9, 22-49*]
Response K6-15: The MPT is not an incinerator. Rather than destroying or breaking apart an organic waste molecule through thermal "oxidation" (as in incineration), it destroys the waste organic through "reduction" in a superheated steam environment.

Comment K6-16: With regard to p. 4-55 of the ACWA DEIS, the process gas burner (PGB) sounds like an afterburner. Does it perform the same function as an afterburner? [*Document 22-20*]
Response K6-16: The PGB is used to burn product gas after storage and sampling. The product gas enters at the bottom and burns along with propane and combustion air. The PGB is a stand alone piece of equipment composed of a combustion air burner coupled with a stack. It consists of an oven chamber that is 8 ft tall and 8 in. in diameter with a 4-ft stack extension (approximate dimensions) for sampling the exhaust.

Afterburners are used in a wide variety of industrial volatile organic compound (VOC) abatement applications. The thermal process in an afterburner converts VOCs to carbon dioxide and water. The PGB can be considered to have a similar function as an afterburner.

Comment K6-17: In discussing the different stacks associated with the different technologies, it is not clear that the diesel-powered generators are a backup system. [*Document 26-24*]
Response K6-17: This point is clarified in Sections 4.5.2.2, 5.5.2.2, 6.5.2.2, and 7.5.2.2.

Comment K6-18: More detailed information on the modifications to baseline reverse assembly needs to be provided. [*Document 42-3*]
Response K6-18: The TRD (Kimmell et al. 2001) provides more detailed information on the modifications to the baseline reverse disassembly process that will be made for each ACWA technology.

Comment K6-19: The different ways of disassembling or getting the explosives and the agents out (e.g., a high-pressure fluid jet and a high-pressure wash to remove the agent) could possibly increase the number of separations to go through. However, it is now thought that some of the agent is gelatinous, so I can possibly see the reason. Is that the case? [*Documents 64-1, 65-1*]
Response K6-19: Yes. It may be difficult to remove the mustard agents by gravity draining or suction draining. Of particular concern are the "heels" or residues in projectiles and mortars. ACWA believes that high-pressure wash will solve the problem.

Comment K6-20: Some of the liquid agent is now gelatinous. How is this removed? [*Document 64-1*]
Response K6-20: Some tests using mustard-filled mortars are currently being done in Utah to address this issue. The Army is concerned about trying to drain the mustard. Previous tests at Edgewood Arsenal on bulk containers indicated that high-pressure hot water could solubilize the mustard heel and move it out to a neutralization process. The Army is now trying to apply this approach to projectiles.

Comment K6-21: You are dealing with a lot more material by using high-pressure fluid jets and washout. [*Document 64-2*]
Response K6-21: Yes. However, the added materials are used at other points in the systems. These added materials were considered in the analyses.

Comment K6-22: How does ACWA intend to ensure "maximum protection" for the community? [*Document 22-66*]
Response K6-22: As outlined in Section 3 of the EIS, there are a number of safeguards integrated into the ACWA systems and the containment structures.

Comment K6-23: There is no indication of how the munitions (at BGAD) will be moved from the storage igloos to the destruction facilities. [*Document 96-14*]
Response K6-23: The movement of munitions is discussed in Section 6.21.1.1.

Comment K6-24: There has to be a safe way to transport chemical agents to an existing chemical destruction site. [*Documents 46-2, 75-3, 75-4, 111-1*]
Response K6-24: The transport of chemical weapons from one stockpile installation to another is prohibited by public law. Section 2.6.2 of the EIS addresses this.

Comment K6-25: How will ACWs be transported from the igloos to the facility? [*Document 50-6*]
Response K6-25: The ACWs can be safely transported from the igloos to the facility. Section 3.3.1 of the ACWA EIS describes transportation.

Comment K6-26: Regarding p. 7-175, line 21 of the ACWA EIS, we request an explanation of the basis for considering the feasibility of using modified ammunition vans (MAVs) instead of ONCs. [*Document 115-31*]
Response K6-26: Because some installations contain munitions with nerve agents, on-site containers (ONCs) were described for all ACW transport in the ACWA EIS. However, the Army is studying the feasibility of using MAVs in lieu of ONCs for some chemical weapons. No decisions regarding the use of MAVs or the applicability of the studies to BGAD have been made. The EIS assumes that the Army would have to determine that the use of MAVs would offer equal or less risk than the use of ONCs before any decision would be made to use MAVs.

Comment K6-27: Page 3-17, lines 16–19 of the ACWA DEIS indicate that during the design and construction of the integrated systems, it might be determined that material handling equipment, mixing tanks, heating components, and similar items not described in the disassembly and treatment processes would be needed. This would leave open the possibility that additional units/processes/systems that are not addressed in the EIS might be added to the facility. If it is not likely that such ancillary equipment would cause or contribute to any significant environmental impact, a statement to that effect would seem appropriate in this section of the EIS to address this potential uncertainty. [*Document 120-67*]
Response K6-27: The pilot test is being conducted to demonstrate the total ACWA integrated system. During pilot testing, it may be determined that this system (the pilot test facility) should be modified to improve performance. For the preparation of this EIS, a bounding approach was taken to estimate operational parameters, emissions, and releases in an attempt to encompass the eventual impacts of the uncertainties inherent in a pilot test facility and an ACWA operating facility. It is not likely that any modifications to a pilot test facility would exceed the bounds assessed in this EIS.

Comment K6-28: It is indicated that ventilation air would be held and tested before being released to the pollution control processes. It is understandable why certain air streams might be held and tested prior to release to the atmosphere, but it is not clear why any of the air streams would be held and tested prior to release to the pollution control processes. Additional explanation would be useful. [*Document 120-68*]
Response K6-28: It is noted that "effluents could be held and tested before being released to pollution control processes." The intent of this capability is to allow the waste stream to be retreated, if needed, rather than having it challenge the air pollution control processes and potentially generate large volumes of contaminated media (e.g., carbon and caustic).

Comment K6-29: Does the "MDB stack" refer to the "filter farm stack" used elsewhere? Terminology should be consistent. [*Documents 108-23, 108-24, 115-35, 115-36, 119-25, 119-26*]

Response K6-29: The MDB stack referred to is a filter farm stack for circulating air and nonprocess emissions from the Munitions Demilitarization Building. The text has been changed to call it the filter farm stack.

Comment K6-30: More complete risk assessments would be useful in determining whether or not Neut/Bioemissions should be treated through carbon filters. [*Document 120-28*]
Response K6-30: As stated in the DEIS, the developer of the Neut/Bioprocess states that emissions from the Neut/Bioprocess would not need treatment through carbon filters. The DEIS considered both treatment and nontreatment in the risk assessment. Further assessments of treatment options for ACWA process effluents are being addressed in engineering design basis (EDB) studies. These are advancing the engineering designs beyond those of the demonstration studies, which form the basis of the ACWA EIS. Permitting studies will also address the issue of emissions treatment further.

Comment K6-31: How can the MDB be the only potential source of agent emissions (see p. 4-82)? Has this system proven there will never be an upset? [*Document 22-29*]
Response K6-31: The referenced section discusses upset conditions, called "fluctuating operations," and the analysis assumes that agent would be released to the filter farm stack (MDB stack). This analysis is considered to be representative of small releases of agent during weapons disassembly or agent treatment.

K.7 FACILITY OPERATIONS

Comment K7-1: Are there any contingency operating plans for extreme weather? What are the consequences of an emergency shutdown? [*Document 50-7*]
Response K7-1: Controlled shutdown is part of facility design. Specific contingency plans for the facility have not yet been developed; however, installation contingency plans do exist.

Comment K7-2: The DEIS documents are unclear as to whether the recycling of water is taken into consideration in determining the amount of process water needed for the nonincineration technologies. Some statement concerning water recycling and an approximate percentage of recycling anticipated for these technologies would be most helpful in determining the total amount of process water to be consumed and/or used. [*Documents 26-6, 26-7, 101-11*]
Response K7-2: Tables 3.4-1 through 3.4-4 on pages 3-22 to 3-25 of the ACWA DEIS provide estimates of water used for process and potable purposes. The technology proponents did consider recycling water streams within the process in order to eliminate liquid discharge and reduce overall water consumption. All water introduced into the facility, whether as process water, spent decontamination, fuel, or equipment washdown, would be treated and reused within the plant. As an example, the Neut/GPCR/TW-SCWO technology would process the liquid effluent from the SCWO system that contains inorganic salts in an evaporator/crystallizer. Here salts would be concentrated into salt cakes for disposal, and clean water would be recycled within the process.

The percentage of process water recycled would depend on the chemical agent and ACWA technology, as well as its current state of development. The EDSs are addressing any process reconfiguration and new equipment that could be used to minimize process water consumption.

Comment K7-3: In both DEISs, there is no information or discussion on using contaminated water in the destruction process. This information could be helpful in determining if there would be an added benefit with each technology. [*Documents 96-21, 101-17*]
Response K7-3: It is unclear in the comment what contaminated water is being referred to. If it is ACWA process water, the text on pages 3-26 and 3-27 in the ACWA DEIS states, "All liquids generated by the process and all liquid laboratory wastes would be reused in the process or disposed of through . . ." for a given ACWA technology. If the comment refers to use of contaminated well water by an ACWA pilot test facility, the EIS does not specify the quality of water to be used by the facility. The potential benefits of using contaminated water in the ACWA process are noted.

Comment K7-4: I understand that the water used for incineration will become hazardous waste and be transported off site and possibly injected into a well in Texas. What happens to the wastewater from the neutralization process? Both neutralization contractors have suggested that they may be able to reuse this water, but the ACWA DEIS does not describe what happens to this nonhazardous wastewater. [*Document 105-4*]
Response K7-4: The ACWA EIS does not identify the commercial hazardous waste disposal facilities that might handle ACWA wastes. Page 3-18 in the ACWA DEIS indicates that neutralization of agent produces residual compounds that are controlled under Schedule 2 of the

CWC. Secondary processes, such as biotreatment or SCWO, are required to destroy these compounds. The liquid product from the neutralization process, called the hydrolysate, is fed into either the biotreatment or the SCWO process for further treatment. All liquids generated by these processes and all liquid laboratory wastes would be reused in the process; brine solution or brine salts would be disposed of according to their appropriate classification.

Comment K7-5: The Neut/Bio process would use 39 acre-ft of process water. Please describe the operations and schedules that this number is based on. How many hours per week, how many weeks per year, and most importantly, how many years would be involved? Would the Neut/Bio process reuse some of the same water, and, if so, what would the consumptive use of the Neut/Bio process be? [*Document 105-5*]

Response K7-5: Testing using the Neut/Bio technology at PCD was conservatively assumed to be about 32 months (2.7 years). Further information on the schedule can be found in the TRD (Kimmell et al. 2001). Process water, spent decontamination fuel, and equipment washdown would be treated and reused within the plant. Data on the consumptive use of water for process purposes are provided in Table 3.4-1 on p. 3-22 in the ACWA DEIS for Neut/Bio and in Table 3.4-2 on p. 3-23 for Neut/SCWO.

Comment K7-6: Volume 4, Section 4.2.2.3.4, p. 40 of the TRD (Kimmell et al. 2001) states that "the ICB [immobilized cell bioreactor] requires several weeks to acclimate, and validation testing requires approximately 40 days," which indicates that treating a batch of agent might take several weeks. Are these apparently fragile microorganisms poisoned by chemicals encountered in the treatment, and will the plant be shut down for weeks at a time for acclimation, etc.? What would the safety and schedule consequences be? Has any thought been given to mutation of these microorganisms under these harsh conditions, thereby creating a biological warfare agent by destroying CWAs? [*Document 77-16*]

Response K7-6: Prior to actual pilot-scale operations, a preoperational testing period known as systemization would be used to ensure that systems are operating as designed. During this time, acclimation and validation testing of ICB^{TM} operations would be performed.

According to the National Research Council (1999) report entitled *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons*, the time required for acclimation of the bio-organism to a mustard hydrolysate feed is on the order of hours. Acclimation to a nerve agent hydrolysate that contains phosphorus in the form of a phosphonate compound may take several weeks.

It should be noted that the Neut/Bio technology proposes to destroy the mustard agent with water and to destroy the energetics with caustic, then treat the resulting mustard hydrolysates with a biological treatment process operated at ambient temperature and pressure. Nerve agents are not being considered for treatment by this technology. Therefore, the time period for acclimation would be on the order of hours.

A microbial culture, specific to the organic constituents in the feed, is established within the ICB media, where they digest the organics, producing carbon dioxide and water. The microorganisms would not be exposed to chemical agents. The biosludge produced in the bioreactor has been shown not to contain pathogenic microorganisms.

Comment K7-7: Page 4-34 in the section on Neut/GPCR/TW-SCWO in the ACWA DEIS states, "The resulting volatile organics would be swept by heated hydrogen gas into the reactor,

where they would be reduced to simple hydrocarbons (HCs) and acid gases." What are the simple HCs? Please list them and describe their impact on human health and the environment. Is hydrogen gas not very explosive? Why is heated hydrogen gas being used? Isn't this dangerous? [*Document 22-46*]
Response K7-7: The simple HCs include methane, carbon dioxide, and carbon monoxide, while the acid gases include hydrogen fluoride and hydrochloric acid. Methane is a simple asphyxiant that forms explosive/flammable mixtures with most oxidizers (oxygen, chlorine, fluorine) and is flammable over a wide range in air. Carbon monoxide is a poisonous material and is highly toxic since it reduces the blood's oxygen-carrying capacity. Carbon dioxide is considered to be a greenhouse gas. Heated hydrogen is used for its reactivity and ability to penetrate small spaces in metal. Industrial controls exist to manage the hazards of hydrogen gas. Given the low quantities of these compounds, the impact on human health and the environment would not be significant.

Comment K7-8: If no processed water or hazardous materials are discharged to the sewage treatment plant, where are these going to be treated? [*Document 56-4*]
Response K7-8: All process water and water with hazardous contaminants will be recycled in the treatment system and will not be discharged.

K.8 FACILITY EMISSIONS AND RELEASES

Comment K8-1: Are there emissions from the ACWA thermal treatment processes? [*Document 56-36*]
Response K8-1: Yes. These emissions are included in emissions listed in the EIS.

Comment K8-2: How are the energetics treated? Does the information on emissions given in this report account for the energetics that must be disposed of? [*Document 22-12*]
Response: K8-2: The ACWA technology systems described in the EIS treat the energetics. The emissions evaluated in the EIS include the emissions from treatment of energetics.

Comment K8-3: In the National Research Council (1999) report entitled *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons*, General Finding 8 in "Summary, Findings, and Recommendations" states, "None of the proposed technology packages complies with the hold-test-release concept for all gaseous effluents (both process and ventilation effluents)." Is this a true statement? This matter is very contentious to those who oppose baseline technology. Have they been misled by the ACWA Dialogue?

Section 4.4.2 (and other areas of the document) state, "If stabilization of the solid salt waste was required, either a waste management facility for stabilizing the waste would need to be constructed at ANAD, or, alternatively, the waste would need to be shipped off site to an appropriately permitted waste facility." This statement implies that the technologies and the proposed facility are not "closed-loop," as advertised. Please comment. Do you intend to build an additional facility to handle the waste by-products produced by these technologies?

Tables 4.6-2, 4.6-3, 4.6-4, and 4.6-5 indicate that a variety of chemicals will be emitted from the technologies. Is it true that these chemicals include dioxins, furans, polychlorinated biphenyls (PCBs), chemical agent, and other chemicals as well? Doesn't this indicate that these

technologies are not closed-loop? What is the impact of releasing these chemicals? Has a health risk assessment been performed for these technologies? What is the impact on the community?

Page 4-50 in Section 4.5.2.2 on emissions from operations indicates that all of the proposed technologies have several stacks each and that each stack has emissions. This is not consistent with a closed-loop system. Is this a true statement? Please explain and justify it. Has there been a health study regarding the emissions from these stacks? How do you know that these emissions will not be harmful to the community and the work force? How can you be 100% sure that chemical agent will not be emitted from these stacks? [*Documents 22-39, 22-64, 22-51, 22-53, 56-10, 56-11, 56-27*]

Response K8-3: The term "closed-loop system" was not used in the ACWA DEIS or TRD (Kimmell et al. 2001) to describe an ACWA system. The ACWA systems use various hold-test-release strategies for liquid and solid wastes. These waste residues will be disposed of off site rather than on site. There are gaseous emissions from the ACWA systems, and these are addressed in the ACWA EIS. There is a limited hold, test, and release capability for gaseous emissions.

Emission estimates continue to be refined as PMACWA obtains additional information in the EDSs. On the basis of these studies, PMACWA has used updated values of dioxin to calculate a total toxic equivalency (TEQ) for the same biotreatment technology as that evaluated in the ACWA technology demonstration (which was the basis for the emission estimates used in the ACWA EIS). The results indicate that total TEQs are significantly less than the federal maximum achievable control technology (MACT) standard for emissions of dioxins and furans from hazardous waste combustors (0.20 ng TEQ per dry standard m^3). The greatest of these TEQ values was less than 25% of the combustor standard. These data are continuing to be evaluated and will be available should a permit be sought for an ACWA technology. However, emission estimates from the ACWA technology demonstrations will continue to be used in the ACWA EIS, since they remain the most conservative estimates of emissions (i.e., the latest data indicate that emission values are lower than those used in this ACWA EIS).

Comment K8-4: These in no mention in the ACWA DEIS on how water from the ACWA processes will ultimately be handled. What happens to water after the process is complete? Water used in any of the processes needs to be evaluated by an independent organization before being declared safe for release. Citizens should certainly have input into who those scientists will be. [*Documents 96-34a, 110-3*]

Response K8-4: The ACWA systems would recycle water from all uses but domestic uses. However, the ACWA systems would release liquid and solid wastes. The ACWA systems would use various hold-test-release strategies for these liquid and solid wastes. These waste residues would be disposed of off site at approved waste disposal facilities rather than on site. Sanitary wastewater (from nonprocess areas and sanitary facilities) would be treated and might be released to surface waters (depending on the site) to meet regulatory requirements, as permitted by the state. The EIS describes the facilities needed and the regulations applicable for sanitary wastewater.

Comment K8-5: The discussion of Neut/Bio in the TRD (Kimmell et al. 2001) does not adequately explain the air emissions at the end of the process. In Volume 3, Section 3.2.2.3.6 of the TRD, the words "for the most part" leave me quite uneasy. [*Document 23-2*]

Response K8-5: The TRD provides emission estimates based on the preliminary design of the ACWA processes available at the initiation of the NEPA processes. More detailed design studies will provide further refined estimates for air emissions for the permitting process.

Further information on the chemical compositions and concentrations of gaseous effluents from the Neut/Bio technology can also be found in the following reference*:* Mitretek, 2001a, *Estimates of Environmental Releases Associated with the Destruction of Assembled Chemical Weapons during Pilot Plant Testing of the Parsons Honeywell Neutralization/ Biotreatment Process,* McLean, Va., May.

Section 3.2.2.3.6 on p. 44 of the TRD states, "The neutralization/biotreatment system for fluid-abrasive cutting and fluid-mining was, for the most part, demonstrated during the demonstration test phase." The statement is inaccurate and will be revised.

Both fluid cutting and fluid mining have been used in the demilitarization of conventional munitions. The document entitled *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons* published by the National Research Council in 1999 states on p. 126, "In view of the significant developments in water-jet cutting technology and its tested use for cutting high-explosive casings, the technique can be considered suitable for application in disassembly operations [of ACWs]."

Comment K8-6: With regard to Volume 4 of the TRD, Section 4.2.2.4.5, p. 47, a better description of the catalytic oxidation unit is needed. What happens if the catalyst becomes poisoned during operation? Are toxic gases emitted through the stacks? Have these gases from biotreatment been characterized? [*Document 77-18*]

Response K8-6: A detailed description of catalytic oxidation is provided in Section 1.4.6.3.3 on catalytic oxidation on p. 44 of the TRD (Kimmell et al. 2001). According to the National Research Council (1999) report, *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons,* because the gaseous effluent stream from the bioreactors will be continuously monitored for hazardous materials, the release of hazardous materials would be considered extremely unlikely if the catalytic oxidation system were to fail. The gaseous effluents from the bioreactors may also be released through activated carbon filters (which would remove any organic contaminants), depending on the results of the preliminary facility design from the EDSs for this technology.

Further information on the chemical composition and concentration of gaseous effluents from the Neut/Bio technology can be found in the following reference: Mitretek, 2000, *Estimates of Environmental Releases Associated with the Destruction of Assembled Chemical Weapons during Pilot Plant Testing of the Parsons Honeywell Neutralization/Biotreatment Process*, McLean, Va., May.

Comment K8-7: ACWA technologies should be operated in such a way that emissions are kept to a minimum. [*Documents 108-5, 108-6, 115-6, 119-7, 119-8*]

Response K8-7: In the ACWA DEIS, potential emissions of air pollutants by ACWA technology systems are compared to installation and county emissions in order to put them in perspective and demonstrate that they would be very small. The pilot test facilities will be designed to meet all state and federal emission limitations. However, see Section 2.4, which describes that factors considered for technology selection will include effluent characterization and management, permitting, and compliance. "Worst-case" emissions and wastes were assumed for the EIS

assessment in order to bound impacts; actual performance of an ACWA pilot test facility would involve lower emissions and releases than those assumed for the EIS.

Comment K8-8: In the TRD, Section 4.3.2.3.4, the estimated emissions in Tables 4.21, 4.22, 4.46, 4.47, and 4.48 appear to be derived from taking allowable emissions and calculating backward rather than from emissions observed in actual experiments. Have these values been demonstrated as being achievable under processing conditions? Where are the operating data? [*Document 77-19*]

Response K8-8: The values provided in Tables 4.21, 4.22, 4.46, 4.47, and 4.48 are emission rates estimated by multiplying the stack gas flow rate by the allowable stack concentrations for each chemical agent. Actual agent emissions are expected to be below the detection limit at all times. However, in order to be conservative and to demonstrate if potential chemical agent stack emissions would cause adverse effects, hypothetical emissions are estimated on the basis of an assumed chemical agent concentration in the stack exhaust gases that is equal to 20% of the allowable stack concentration (ASC) recommended by the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

With regard to operating experience, the *Supplemental Report to Congress, June 2001* (PMACWA 2001) reports that chemical agents were destroyed by the ACWA technologies to "six nines," that is, to 99.9999%; energetics were destroyed to 99.999%, a level that also meets performance objectives. HD, GB, and VX were not detected in any process stream exiting the ACWA technologies.

The filtration system is composed of a standard particulate filter, a high-efficiency particulate air (HEPA) filter, six carbon filters, and a final HEPA filter. The removal efficiency for organic compounds, including chemical agents, depends on the carbon filters and is approximately 99.999998%, assuming a conservative value of 95% VOC removal efficiency for each carbon filter. The filtered exhaust gases would be monitored continuously for agent.

The overall removal efficiency of chemical agents by the ACWA technologies would therefore be on the order of 99.999999999998%, or below detection limits. A conservative estimate of the chemical agent emission rates was therefore assumed in the analysis.

Comment K8-9: Although hazardous waste is produced as part of the ACWA technologies, pollution prevention practices need to be followed during construction and operation. [*Documents 108-1, 119-3*]

Response K8-9: The analysis estimated conservative amounts of hazardous waste. Design will involve a consideration of pollution prevention through the selection criteria used for resource requirements and life-cycle costs (Section 2.4).

Comment K8-10: Pages 4-212 and 4-213 of the ACWA DEIS indicate that the Neut/Bio treatment process would utilize a hazardous substance listed under the *Comprehensive Environmental Response, Compensation and Liability Act* (CERCLA) (i.e., ferrous sulfate). The addition of this sulfur-bearing compound could potentially increase the difficulties associated with the ultimate disposal of the waste streams that this technique generates. The Elchem Ox process uses silver nitrate. Silver compounds are potentially RCRA hazardous wastes (via toxicity characterization). The addition of a silver-bearing compound could similarly increase difficulties associated with the ultimate disposal of generated waste streams from this process.

The production of these hazardous/toxic materials is a potentially significant problem that will have to be factored into the decision-making process for selecting a treatment technology. [*Document 120-61*]
Response K8-10: Waste quantities, types, and classifications were part of this ACWA EIS analysis.

Comment K8-11: In the National Research Council (1999) report entitled *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons*, General Finding 1 states, "One of the crucial issues is the identity and disposition of byproducts." Has this issue been resolved? How will these by-products be disposed of? What will their impact be on human health and the environment? [*Document 22-56*]
Response K8-11: The by-products (wastes) from an ACWA pilot plant are identified in the EIS and included in the analysis.

Comment K8-12: Page 4-50 in Section 4.5.2.2 on emissions from operations in the ACWA DEIS indicates that all of the proposed technologies have several stacks each and that each stack has emissions. Tables 4.6-2, 4.6-3, 4.6-4, and 4.6-5 indicate that a variety of chemicals will be emitted from the technologies, including dioxins, furans, PCBs, chemical agent, and other chemicals. This is not consistent with a closed-loop system. Is this a true statement? Please explain and justify it. Has there been a health study regarding the emissions from these stacks? How do you know that these emissions will not be harmful to the community and the work force? How can you be 100% sure that chemical agent will not be emitted from these stacks? [*Document 22-51*]
Response K8-12: The proposed technologies are all open systems, with interchange of matter between the technology and its surroundings. The chemical compounds shown in the above-cited tables are those that were detected during demonstration testing of the proposed technologies. Further testing and future process improvements may eliminate some of these chemical compounds. Emissions of chemical agent were not detected during demonstration testing. A health study on the emissions from the proposed technologies separate from the EIS has not been performed. However, the potential impacts of air pollutant and toxic air pollutant emissions are addressed in the EIS. There would be no significant impacts associated with emissions during normal operation of the technologies. It is possible that small quantities of agent could be released from the filter farm stack. In the unlikely event that some agent was not destroyed in the neutralization process and subsequent treatment, it would be detected, and the causes would be mitigated immediately. This topic is addressed in the EIS. See also Response K8-8.

Comment K8-13: What are the standard precautions taken to preserve surface water? Define the safety features used to contain a spill and protect surface water. [*Documents 96-35, 96-36, 105-7*]
Response K8-13: Standard construction practices and all applicable local, state, and federal regulations will be followed during design and construction of the facility. Detailed designs have not been developed at this point. All assumptions about existing resources and materials will be confirmed during detailed design procedures.

L GENERAL ENVIRONMENTAL ISSUES

Comment L-1: The data related to possible air quality and groundwater contamination at PCD are insufficient to clearly favor an ACWA technology. [*Document 7-2*]
Response L-1: The air quality modeling and the assessment of potential groundwater contamination were based on the best information for both site conditions and the technology description.

Comment L-2: The EIS does not reveal all of the information available on the proposed technologies. A lot of the information is incomplete since the technologies are immature. It seems as if many of the conclusions reached were based on outdated research material, and no actual samples were taken for this document. Are there plans to actually test existing wells for specific water quality and flow rates or to install air quality monitors prior to construction activity, and, if so, will the results be part of the final EIS? Will additional data be collected on system reliability? [*Documents 22-76, 77-20, 105-2*]
Response L-2: The EIS was developed by using the most current data available. There are no plans to perform additional environmental sampling as part of this EIS. However, additional sampling may be performed as part of future assessments associated with environmental permits. The criteria that were used to evaluate technologies for possible implementation included performance maturity, operability, and process monitoring and control, which contribute to reliability.

Comment L-3: There are references that standards are being met and therefore there are no impacts. However, there may be impacts even though standards are met. [*Document 29-2*]
Response L-3: Standards are implemented to protect human health and the environment; these standards are based on environmental and health effect implications. Standards are used in impact assessments as one of several criteria to determine whether impacts are significant.

Comment L-4: The ACWA DEIS seems to give a more realistic estimate toward the numbers of injuries, deaths, supply and demand on utilities, etc. The data are incomplete. Those things that ACWA has stated as unavailable or under revision need to be included before the final EIS is released. [*Document 96-49*]
Response L-4: The ACWA DEIS was prepared with the best information and data available. Between the draft and final EIS, new information was incorporated as it became available. The information was put in an appropriate format that could be referenced and made available to the public. Care was taken to maintain consistency with regard to the maturity of the information across technologies, so that alternatives could be compared. For this reason, system descriptions and estimates of resource requirements and emissions were based on data from technology demonstrations.

Comment L-5: With regard to Section 4.10.3, p. 4-69 of the PCD DEIS and Section 6.8.1, p. 6-84 of the ACWA DEIS, the EPA has set levels of 55 dB(A) for daytime noise levels and 50 dB(A) for nighttime noise. PMCD states that it will meet the daytime levels and that there will be no construction at night. However, to meet the treaty deadline of April 2007, which the

Army has said it can meet, construction for the facility would need to occur 24 hours per day, and the nighttime noise level limit could not be met. [*Documents 96-70, 106-6*]

Response L-5: The noise levels presented in the text are upper-limit estimates, and day and night limitations were considered. If other noise attenuation mechanisms, such as ground effects and air absorption, were considered, noise levels at the receptor locations would be much lower. If construction activities would be required during nighttime hours and if resulting noise levels would be higher than a guideline value, additional noise control measures (e.g., installation of mufflers on engine exhaust stacks) would be implemented.

Comment L-6: Will there be visibility impacts from the operating stacks or from construction emissions at PCD? [*Documents 96-53, 106-7*]

Response L-6: The ACWA EIS concludes that the effects of construction on visual resources would be temporary and intermittent and that operations would not create significant visible emissions.

M INFRASTRUCTURE

Comment M-1: The infrastructure enhancements that are planned for PCD as part of chemical demilitarization are useful for redevelopment only if they are accessible for development. The EIS assumes that they will be. [*Documents 26-9, 96-23, 101-19*]
Response M-1: Planning for redevelopment at PCD has been underway for several years. The installation is coordinating its activities with those of the community to the extent possible. Should an ACWA pilot test facility be constructed and operated at PCD or some other installation, infrastructure requirements would be coordinated with other site needs and activities. Activities associated with redevelopment are not part of the action considered in this EIS.

Comment M-2: Paragraph 4.2.4-1 on p. 4-12 of the ACWA DEIS states, "Proposed testing activities at ANAD would be conducted within the CLA [Chemical Limited Area]." This statement needs to be clarified. Are these facilities going to forego the Army security requirement? [*Document 22-33*]
Response M-2: If an ACWA pilot test facility is located at ANAD, the facility will be located inside the CLA by extending the perimeter fence of the CLA to include the proposed facility. Appropriate text has been added to the document.

Comment M-3: Table 4.3-1 of the ACWA DEIS indicates that electricity usage by the ACWA facility would range from 50% to almost 200% of 2000 usage. Won't this cause a negative impact on the surrounding areas, even though this document says the impact will be independent of ANAD? [*Document 22-3*]
Response M-3: The availability of electricity to meet the needs of the pilot test technologies is primarily constrained by transmission line capacities, not by the availability of sufficient electricity supplies. Therefore, there are not likely to be any impacts to electricity supplies in the surrounding area. The text in the document has been revised to indicate there would be no off-post impacts.

Comment M-4: Paragraph 4.3.3.2 on p. 4-19 of the ACWA DEIS states, "No process water or hazardous materials would be discharged to the ANAD sewage treatment plant." Where will the process water be discharged? How will it be disposed of? Is a permit required? [*Document 22-36*]
Response M-4: Process water would be decontaminated, recycled, and reused within the pilot facility. Appropriate text has been added to the document clarifying this point.

Comment M-5: The ACWA DEIS states that all increased demands on infrastructure are assumed to be approximately equal in number of years, thereby allowing an actual comparison of overall increases in electricity, natural gas, process water, potable water, and sewage between technologies. Please clarify. [*Document 115-43*]
Response M-5: The actual size of an ACWA pilot test facility has not been determined. In addition, it is not known how long it would take to obtain the needed pilot test data. In order to bound impacts and compare technologies, when there are adequate ACW inventories, a consistent facility size and operational period were assumed for all technologies. This practice

allows the impacts of different technology systems to be compared on an equal footing. For instance, differences in emissions would be due to differences in processes, not to facility size.

Comment M-6: Number not used.
Response M-6: Number not used.

Comment M-7: Figure 7.3.1 in the ACWA DEIS does not seem to correspond with the statement that the Elchem Ox process uses the greatest amount of electricity. [*Document 115-2*]
Response M-7: For each installation, the electric power requirement for Elchem Ox has been corrected. For BGAD (Section 7.3.1.2), the requirement is 122 GWh.

Comment M-8: The water use and recycling issues concern me with regard to all the ways materials can be disposed of and what materials will be released to the environment. [*Documents 90-1, 92-1, 102-3*]
Response M-8: The EIS analysis used very conservative estimates of water use and disposal (i.e., it used the highest estimated use of water and the largest estimated discharge of water). Even at these levels, no significant environmental impacts were found. Comments from potential constructors and operators of any ACWA pilot facility state that they will use less water in their systems and have less liquid waste than those considered in the EIS.

Comment M-9: The PCD DEIS and ACWA DEIS state different current water use rates at PCD. [*Document 96-31*]
Response M-9: Water use numbers were supplied by PCD.

Comment M-10: Existing water lines at BGAD might be either 2 in. or 4 in. and should be verified. [*Document 112-1*]
Response M-10: Detailed designs have not been developed at this point. All assumptions about existing resources and materials will be confirmed during detailed design procedures.

Comment M-11: On p. 6-79, line 15 of the ACWA DEIS, please clarify the sentence starting with "in order to use the ACW destruction systems for pilot testing, plans have been made to recycle all process water through the system." Why does process water have to be recycled through the system to use an ACWA system for pilot testing? [*Document 120-29*]
Response M-11: As written, the statement was misleading. There is no need or requirement to recycle process water to use an ACWA system. Recycling of process water is used as a pollution prevention measure. The statement now reads, "For ACW destruction systems, plans have been made to recycle all process water in order to reduce wastewater discharge."

Comment M-12: Data in Table S.4-1 on p. 5-26 of the ACWA DEIS do not match data shown on p. S-21. [*Document 25-6*]
Response M-12: The table has been changed. Potable water uses were added in the groundwater and surface water portions of the table to match the uses shown in the water supply portion of the table.

Comment M-13: How were water use numbers estimated, how much water will be used, how much will be re-used, how much will be produced, and do these numbers vary with technology? [*Documents 96-33, 102-3, 109-2, 115-44*]
Response M-13: The EIS gives the water use estimates for each technology for each site. To find further information on how the water use estimates were calculated, see the TRD.

Comment M-14: The projections of consumptive water use are not well defined. The Army spokesperson at the PCD meetings also said that final figures on consumptive use have not been determined. The EIS needs to include the final estimates. [*Documents 120-5, 135-5*]
Response M-14: The EIS includes revised estimates based on additional analysis of ACWA technology demonstrations. Groundwater consumption was based on the best information currently available for Pueblo.

Comment M-15: With regard to p. 6-35, line 15, and p. 6-34, line 22 of the ACWA DEIS, what is the level of certainty that water will be recycled from the liquid wastes at an ACWA facility? Economic considerations at one baseline incineration facility prompted a decision by the Army to discontinue drying brine into a dry salt for shipment off site. What would the impact to waste generation and water use rates be if water recycling was not conducted? [*Document 120-22*]
Response M-15: The current process configurations for the ACWA technologies include recycling of water streams within the process to eliminate liquid discharge and reduce overall water consumption. Process water, including spent decontamination fluids, and equipment washdown water would be treated and reused within the plant. The only liquid effluent would be sanitary wastewater.

The percentage of process water to be recycled depends on the chemical agent and ACWA technology, as well as its current stage of development. The EDSs are addressing any process reconfiguration and new equipment that could be used to minimize process water consumption.

The brine salts contain about 70% solids after water has been removed. The water content in the dried brine salt is bound as water of hydration. If it is assumed that water was not removed from the brine salts, the volume of the brine salt waste stream would increase by 30%.

Comment M-16: There are no quantitative estimates of the amount of water required for construction activities. [*Document 112-2*]
Response M-16: As stated, past experience with construction projects of similar size and scope indicates that this need is small in relation to existing capacity. No detailed estimation was prepared.

Comment M-17: One of the big issues being discussed about water is the term “processed water.” We don’t exactly know what processed water is. Several of us are trying to look at this. Does that mean total consumptive use of water? [*Document 29-3*]
Response M-17: This response assumes that the term “processed water” stated in the comment is equivalent to the term “process water” used in the ACWA DEIS. Process water is the amount of water used during the ACWA processes and includes water for decontamination purposes and equipment washdown. Tables 3.4-1 through 3.4-4 on pages 3-22 to 3-25 of the DEIS provide estimates of water used for process and potable purposes. Estimates consider the process water to be “consumed,” because no wastewater is released from the ACW destruction processes.

Comment M-18: PCD water use figures and wastewater production figures are significantly different. [*Document 120-16*]
Response M-18: The text has been changed to address the discrepancy.

Comment M-19: The terms "used," "consumed," "recycled," and "processes" are very confusing. The terms "used" and "consumed" have special meaning in Colorado water law. How much water is "used" and "consumed" in the ACWA facility, and how much is recycled? [*Documents 26-6, 45-2, 96-18, 96-67, 101-10, 101-11, 106-3*]
Response M-19: Water use terms in the DEIS reflect common English usage and not legal terminology. The term "water use" in the DEIS reflects the amounts of water needed for the construction and operation of an ACWA pilot test facility. Some of this water is used in the technology processes that make up an ACWA system; this is "process" water. Other water is used for other purposes such as domestic uses. Water may be recaptured at the end of a process and returned or "recycled" back to the beginning of the process. With the exception of any domestic sewage discharges, all water used for an ACWA facility is "consumed" in the legal sense, since it is not returned to the local environment. In particular, at PCD, all water is consumed, because the sewage treatment system does not produce an outfall. The TRD (Kimmell et al. 2001) provides details on all water use, consumption, and recycling.

Comment M-20: My understanding is that in the neutralization processes, there is some degree of recycling. Where does that water go? How is it used? If it's recycled, does that recycling diminish the processed water? The other DEIS compares water usage, and it looks like a whole lot more water is being used by the neutralization methods. Is that true? When you use the neutralization method, are you reusing the water and, in essence, saving water, or not? [*Documents 29-4, 115-44*]
Response M-20: The proponents for the ACWA technologies did consider recycling of water streams within the process, to eliminate liquid discharge and reduce overall water consumption. Water introduced into the facility as process water, including spent decontamination fluids and equipment washdown water, would be reused within the plant. As an example, the Neut/GPCR/TW-SCWO technology would process the liquid effluent from the SCWO system containing inorganic salts in an evaporator/crystallizer, where salts would be concentrated into salt cakes for disposal and clean water would be recycled within the process.

The neutralization process would be a net user of water (i.e., water is added during hydrolysis of the chemical agent and energetics). Clean water recycled from other parts of the process (e.g., water generated during production of dried brine salts) would be recycled back to the neutralization process. The use of recycled water would diminish the process water requirement for the neutralization step and the overall technology.

Comment M-21: Details on existing BGAD water treatment and distribution systems were provided in these documents. [*Documents 94-2, 94-3, 94-4*]
Response M-21: The text of the ACWA FEIS, including text in the cumulative impact sections, has been modified to reflect the additional information.

Comment M-22: In Section 4.3-4 of the ACWA DEIS, no information is provided on the current communications system. Please provide this information. [*Document 22-37*]
Response M-22: Information on the location and characteristics of the current communication system within ANAD was not available and so could not be provided in the EIS.

N WASTE

Comment N-1: Given the existing high levels of toxic chemicals in the environment and our bodies, any activities involving ACWs, including the additional release of hazardous wastes, are "significant." [*Documents 108-3, 115-4, 119-5*]
Response N-1: Your comments are noted.

Comment N-2: We urge pollution prevention practices to be upheld during construction as well as during operations. [*Document 115-2*]
Response N-2: Pollution prevention requirements based on Executive Order 12856 and the *Emergency Planning and Community Right-to-Know Act* (EPCRA) require the reduction of all hazardous material and waste streams. In order to remain in compliance with these requirements, all federal installations must follow pollution prevention plans. This activity includes both the construction and operation of all federal installations. Pollution prevention has been part of the design requirements for ACWA technologies.

Comment N-3: How much waste will be produced by these technologies? What is going to be done with it? [*Documents 28-3, 35-1, 62-3, 62-4*]
Response N-3: The ACWA EIS identifies the waste generation rates and potential treatment and disposal options for the different ACWA technology systems.

Comment N-4: How much will the total waste generated by the ACWA pilot facilities amount to? [*Documents 22-7, 22-8*]
Response N-4: The unit of measure used in the tables on wastes generated is tons per year. To calculate the total waste generated by that technology system, multiply the numbers in the annual waste generation tables by the number of years of pilot testing by that technology system.

Comment N-5: It appears from the EIS that solid and liquid wastes, both hazardous and nonhazardous, have been estimated by using techniques that rely on a number of assumptions. The EIS states that all the proposed ACWA technologies would produce solid wastes that would be probably classified as hazardous waste (e.g., brine salts). None of the proposed ACWA technologies has been developed enough to definitely determine quantities of hazardous and nonhazardous wastes, exact by-products, or a means of disposing of the waste that is proven to be environmentally safe. [*Documents 22-3, 29-12, 112-8]*
Response N-5: The assumptions used in the EIS are highly conservative. If wastes could not be concluded to be nonhazardous, they were considered to be hazardous wastes in the analyses. The appropriate classification of these wastes as hazardous or nonhazardous would be further defined as part of pilot testing. The actual quantities of wastes, particularly hazardous wastes, may be less than the quantities used in the analyses. The wastes generated by ACWA facilities would be treated on site and disposed of off site in commercial facilities. Some additional treatment might be required at the off-site facility prior to disposal. This issue is addressed in Sections 4.4, 5.4, 6.4, and 7.4 of the EIS.

Comment N-6: On p. 6-35, line 2 of the ACWA DEIS, in the sentence that starts, "Depending on the technology chosen . . .," please clarify the meaning of "amount of loading of the wastes in

the stabilization matrix." Does this term refer to the amount of treatment reagent that would be needed to treat the salt (on site) to below the hazardous waste land disposal restriction (LDR) requirements? [*Document 120-21*]
Response N-6: The amount of loading of the waste in the stabilization matrix is defined as the weight of the waste divided by the total of the weight of the stabilization material plus the weight of the waste.

Comment N-7: On p. 6-224 of the ACWA DEIS, all data currently available appear to indicate that hazardous waste streams will be produced from the pilot test facilities. It is unclear why the word "potentially" is used in this sentence. [*Document 120-39*]
Response N-7: The word "potentially" in this sentence was removed from the document.

Comment N-8: The ACWA DEIS does not provide a specific breakdown of hazardous wastes generated from each of the four chemical treatment technologies. Table 4.4-5 addresses only the wastes generated from the ACW incinerator at ANAD. [*Document 120-53*]
Response N-8: Section 4.4.4 on the impacts of no action includes a discussion of the continued storage of ACWs and operation of an incinerator currently under construction. Table 4.4-5 lists the estimated waste expected from this incinerator. Section 4.4.3 discusses the impacts of the proposed action. Tables 4.4-2, 4.4-3, and 4.4-4 list all of the estimates for hazardous and nonhazardous wastes for each of the four chemical treatment technologies.

Comment N-9: Regarding waste estimates for ANAD, how would the projected waste generated in the ANAD incinerator compare with the waste generated from the operational facilities at JACADS and TOCDF? [*Document 22-15*]
Response N-9: Information from JACADS and TOCDF was used in developing the estimates for incinerator operations at other sites, such as ANAD. However, a comparison of incineration facilities is outside the scope of the ACWA EIS. Because wastes generated by destruction facilities depend on site-specific factors, such as the configuration of the destruction system, types of agents treated, and types of weapons treated, these comparisons are not relevant for the waste generation calculations for the ACWA systems at ANAD.

Comment N-10: Page 4-32 of the ACWA DEIS states that the amount of hazardous waste could increase by a factor of 2.5. Is this expected? Will another plant or facility really be constructed to treat the waste from destroying the rockets? Will this new facility also produce a waste stream that has to be disposed of? [*Document 22-10*]
Response N-10: The factor of 2.5 is an estimate of the potential volumetric increase that might occur during stabilization if the salts and biomass wastes failed the RCRA Toxicity Characteristic Leaching Procedure (TCLP) tests. The Neut/Bio technology is considered a viable solution for the destruction of ACWs containing mustard agents, but not for ACWs containing nerve agents. ACWs in the form of rockets contain nerve agents. The operation of a pilot facility to demonstrate the Neut/Bio technology would not preclude any existing chemical demilitarization programs at a given installation. ACWs that would not be treated by the Neut/Bio technology would continue to be stored until their destruction.

Comment N-11: Where are the adequate facilities for handling hazardous and nonhazardous wastes located? [*Documents 26-31, 96-69*]

Response N-11: PCD would select appropriately permitted treatment, storage, and disposal (TSD) facilities. For nonhazardous wastes, these facilities would likely be local, whereas for hazardous wastes (for which the appropriately permitted number of facilities is much fewer), the selection would be from regional sites (spread over several states).

Comment N-12: Regarding ACWA-created hazardous and nonhazardous wastes and the existing disposition of current amounts handled, it is not clear from the referenced table that the capacity exists, since none of these wastes are generated from chemical weapons treatment and therefore might not be applicable to this particular waste stream. [*Documents 108-26, 115-45, 119-29*]

Response N-12: The referenced tables (Tables 4.4-1, 5.4-1, and 7.4-1) characterize the wastes currently generated on post and, as the comment notes, do not include any wastes generated from demilitarizing chemical weapons. The statement concerning adequate disposal capacities summarizes the current situation for waste disposal. The text has been clarified and rearranged in Sections 4.4, 6.4, and 7.4. Similar changes have been made in Section 5.4.

Comment N-13: Wastes noted in the referenced table as being shipped off post need to be identified with regard to what types of waste leave the post now as compared to the wastes created by ACWA, what type of treatment those wastes shipped off post would be subject to, and where the current and proposed reception sites would be located. Are the current locations permitted to handle wastes from the treatment of chemical weapons? Are the communities willing to accept such wastes? Are there any "special" processes needed for additional permits at the proposed reception sites? What is the anticipated public reaction in communities that are informed that they may be receiving such wastes? [*Documents 106-5, 108-27, 108-28, 115-46, 115-47, 119-30, 119-31*]

Response N-13: Tables already identify which wastes are shipped off post. However, the destinations of the wastes listed have not been determined. Licensed facilities for the wastes generated by an ACWA pilot test facility would be identified after decisions on which installation would host an ACWA pilot test facility and on which technologies would be pilot tested were made. Issues associated with community reaction to waste reception are thus premature at this time.

The wastes from an ACWA pilot test facility will be subject to the same classification requirements as any other waste. Once classified under applicable rules and regulations, the wastes will be shipped to a facility licensed to store or treat such wastes.

Comment N-14: The DEISs do not provide enough information on the transportation of wastes from PCD. Issues such as managing brines and other hazardous chemicals shipped on local roads are important, especially to the agricultural community. One cannot determine from these documents which technology would place the highest demand on the local highways or which technology would require the greatest volume of hazardous waste to be transported into or out of PCD. Large quantities of hazardous and nonhazardous wastes are already being shipped through local communities. The quantities of wastes generated by ACWA will increase the quantities of wastes shipped. [*Documents 112-9, 120-8, 135-8*]

Response N-14: The quantities of wastes that would be generated by an ACWA facility were conservatively estimated in the EIS. Potential impacts were assessed on the basis of these

conservative estimates and are presented in the EIS. An analysis of the human health risks from waste transportation has been added to the EIS.

Comment N-15: The document does not discuss how nonprocess wastes (office trash, personal protective equipment, decontamination solution, spent carbon filters, etc.) will be disposed of. Can the technologies being considered destroy these nonprocess wastes? Are any of these wastes contaminated with chemical agent? [*Documents 16-3, 22-40*]
Response N-15: If any of the various nonprocess wastes are found, through monitoring, to be contaminated with chemical agents, they would be added to the dunnage waste stream (another contaminated nonprocess waste) and treated accordingly. The EIS has been revised to indicate this. If the wastes are not contaminated, they would be disposed of by methods appropriate to their classification.

Comment N-16: No substantial analysis of the different waste streams, on an alternative-by-alternative basis, is provided by either DEIS. Each DEIS should address the quantity of wastes that will likely be produced by each alternative and should also break that waste into solid wastes and types of hazardous wastes by waste code, for each considered alternative. Lack of this information is a significant deficiency. [*Document 95-1*]
Response N-16: Each proposed treatment technology takes many small input waste streams, adds them together, and treats them as one common input stream. The wastes that are important are the treated wastes from the treatment technology, since they are the wastes that must be disposed of in the ground. Each of the proposed technologies generates several types of treated waste. For PCD, the annual amounts and types of waste for each technology are listed in Tables 6.4.2, 6.4.3, and 6.4.4 in the ACWA DEIS.

Comment N-17: Page 3-20, lines 14–20 of the ACWA DEIS indicate that solid residues from pollution abatement equipment and waste handling processes could be managed as solid waste rather than hazardous waste. This would be the case unless the residuals had the potential to leach heavy metals above TCLP levels. Chemical agents are listed as hazardous waste in some states (e.g., Kentucky). Therefore, any solid residues from pollution abatement equipment and waste handling processes that have been in contact with chemical agent would be considered as a listed hazardous waste. Hence, this material would have to be managed as a hazardous waste. [*Document 120-69*]
Response N-17: The discussion on p. 3-20, lines 14–20, has been modified in the document to reflect the point made in the comment.

Comment N-18: Page 4-33 of the ACWA DEIS mentions how liquid wastes will be disposed of, but what about solid waste? If carbon is only treated, how can you tell if it has been decontaminated? How will you get rid of carbon that you cannot determine is agent-free? [*Document 22-11*]
Response N-18: As stated in the first full paragraph on page 4-33, “Wastes listed as hazardous in the RCRA regulations would be stored and disposed of off post as prescribed by the EPA and applicable state and local regulations.” This response assumes that the carbon identified in the comment refers to the spent carbon filters used for off-gas filtration of the process emissions and ventilation air. The current approach for spent carbon is to combine it with the energetics hydrolysate and size-reduced wood, plastic, and rubber to produce a pumpable slurry, which is

fed to the SCWO unit. On the basis of a DRE of at least 99.9999% for mustard and nerve agents for the Neut/SCWO technology, the effluent produced would be of low concern and impact to human health and the environment.

Comment N-19: The analysis of alternatives should evaluate the impacts of energetics treatment and/or disposal. Currently, most alternatives involve both on-site and off-site treatment and disposal without examining the potential environmental impacts of either on-site treatment or off-site treatment and disposal. [*Documents 120-9, 135-9*]
Response N-19: In the ACWA technology systems, energetics as well as agents are destroyed. None of the ACWA systems uses other on-site or off-site treatment or on-site or off-site disposal for energetics.

Comment N-20: How effective are ACWA technologies at treating PCBs? What are the toxic intermediate by-products that result from the treatment of PCB-containing materials? [*Documents 22-42, 115-3*]
Response N-20: The treatment of chemical agents and munitions, some of which contain PCBs, is likely to generate small amounts of dioxins, furans, and other dioxin-like PCBs as intermediate breakdown products from the PCBs. These compounds are highly toxic and, depending on their release concentrations to the atmosphere, represent a potentially serious impact to the environment and human health. However, these release concentrations are expected to be very small (see Sections 4.6, 5.6, 6.6, and 7.6) and to not result in adverse health impacts (see Section 7.7).

Comment N-21: You should have explained that a permit with treatment standards must be obtained prior to treatment of PCB waste. Can a *Toxic Substances Control Act* (TSCA) permit be obtained to treat PCBs? [*Documents 22-6, 120-76*]
Response N-21: Section 9.2.1.2 discusses the need for ACWA facilities to obtain PCB permits if M55 rockets, which contain PCBs in the tube materials, are to be treated. It discusses the different types of permits that can be obtained and the applicable regulations.

Comment N-22: The EIS states that brine wastes from any ACWA technology could contain PCBs, yet offers no information as to how these wastes would be treated. It appears that a plan for further treatment does not exist. [*Documents 22-41, 22-54, 56-5, 56-16, 108-2, 112-7, 115-3, 119-4*]
Response N-22: Section 9.2.1.2 addresses the options available for treating or disposing of materials contaminated with PCBs. These options are to (1) demonstrate that the ACWA systems adequately treat PCBs or (2) use commercial PCB treatment and disposal facilities if PCB residuals remained after treatment in an ACWA facility. The ACWA demonstrations did not test PCB destruction because of schedule restrictions. However, demonstrations did test materials that have similar chemical compositions (i.e., pentachlorophenol). Results indicate that the PCBs will be destroyed by ACWA systems. In addition, some of the ACWA technologies, such GPCR, are being used commercially to destroy PCBs.

Comment N-23: What if the salt waste is determined to contain agent? [*Document 22-4a*]
Response N-23: If, after treatment, salt waste was determined, through monitoring, to contain more agent than some set regulatory limit, the waste would be recycled back through the treatment units until the limit was met.

Comment N-24: What are the differences between the brine solution that results from incineration and the brine salts that result from the ACWA technologies? [*Document 29-11*]
Response N-24: One difference between the brines and salts is the degree of liquid that is retained in the material. Brines are liquids with high salt concentrations. Salts are more solid in form but may retain some liquid. Upon evaporation to dryness, the brine solution from the incinerator is quite similar to the brine salts that would result from ACWA technologies. There are differences, however. Any nonvolatile heavy metal in the ACW material would be in the form of ash waste from the incinerator, whereas it would be in the form of brine salts from the ACWA technologies. A volatile heavy metal, such as mercury, would be in the form of brine salts from all technologies. Lead, being somewhat volatile, is in between the volatile and nonvolatile metals and might show up in both the brine and the ash from the incinerator.

Comment N-25: With regard to p. 6-29, line 20 of the ACWA DEIS, does ACWA have any test data showing that the brine salts would pass the RCRA TCLP test? It is the U.S. Environmental Protection Agency's (EPA's) understanding that lead and mercury are contained in significant quantities in the mustard projectiles. Given the presence of lead and mercury, it should be concluded that the brine salts will likely fail the TCLP test and will be characteristic hazardous waste as well as listed hazardous wastes in Colorado. [*Document 120-18*]
Response N-25: If the process liquids contain sufficient heavy metals, the generated brine salts will fail the TCLP. At least three important parameters determine the amount of metal in the process liquids: system design, destruction technology, and type of chemical weapon. The combination of these three (or more) parameters (which would control the amount of metal scavenging on the metal bodies present in each type of chemical weapon) would also determine the metal concentrations in brine salts. If this scavenging could be minimized, a destruction system could generate brine salts that would pass a TCLP test. At this time, these questions are unresolved, and they will remain unresolved until the results of pilot testing. The ACWA DEIS makes no attempt to resolve any of these current uncertainties.

Comment N-26: With regard to p. 6-32, line 22 of the ACWA DEIS, has the ACWA program identified any potential off-site facilities that could accept the untreated brine salts for treatment and disposal? It is unclear whether the polyethylene encapsulation treatment identified in the EIS would be acceptable treatment under the 40 CFR Part 268 land disposal restriction (LDR) requirements for brine salts. [*Document 120-19*]
Response N-26: Until the ACWA program chooses the destruction technology to be used for the ACWA pilot plant, it seems premature to investigate whether there would be any TSD facilities willing to accept unstabilized brine salts from ACWA treatment. The reference to the specific treatment of polyethylene encapsulation for stabilization of brine salts identified in the ACWA DEIS is no longer appropriate and has been removed.

Comment N-27: With regard to p. 6-34, line 1 of the ACWA DEIS, given the levels of heavy metals found in the brine produced at the baseline incineration facilities that are treating mustard

and other chemical agents, it appears likely that the brine salt from an ACWA facility would be a characteristic hazardous waste. It does not appear to be appropriate to pursue a delisting of brine salt and other residues from the ACWA facilities, unless more detailed analytical data that support such a delisting petition are generated. For purposes of the FEIS, the EPA recommends that all salt, biomass, and other residue should be considered hazardous waste. [*Document 120-20*]

Response N-27: All salts, biomass, and other residues are considered to be hazardous waste in the ACWA DEIS. Page 6-34 does not say that a delisting of brine salts and other residues would be pursued. It says that information on the brine salts was insufficient to support a delisting procedure for these wastes.

Comment N-28: On p. 6-29 of the ACWA DEIS, the second paragraph states, "If the solid salt wastes would need to be stabilized, either a waste management process for stabilizing the waste would be needed, or alternatively the waste would need to be shipped off post to an appropriately permitted treatment facility. If the salt wastes would need to be treated, a new treatment facility might need to be constructed." We recommend that the handling of the salt wastes be discussed more thoroughly. What impacts would a treatment facility have? Would the treated salt wastes be landfilled? How would wastes from the treatment facility be disposed of? [*Documents 29-6, 29-11, 29-12, 120-17, 120-40*]

Response N-28: It seems premature to discuss impacts of a brine treatment facility for waste stabilization when there are, as yet, so many unanswered questions. Will the generated brine salts actually fail the RCRA TCLP test? Even though the answer is probably yes, does a brine stabilization technology exist that will generate a stabilized waste that could pass the TCLP tests or, for that matter, that will satisfy the 40 CFR Part 268 LDR requirements for brine salts? Will an existing TSD facility accept untreated brine salts for treatment and disposal, or will the federal government have to build this facility? Will it be placed at one or more of the ACW storage sites discussed in the ACWA DEIS? If the LDR requirements for these brine wastes cannot be satisfied, how will the waste be disposed of? Brine salts are notoriously difficult to stabilize. Definitive answers to these many questions are not, as yet, available. These uncertainties are discussed in the ACWA DEIS, but because no specific answers are yet available, the problem is not discussed in detail.

Comment N-29: A number of salts are generated. Are there industries that can use these salts as materials in their processes? [*Document 64-3*]

Response N-29: There are possible uses for some of the materials. However, the EIS does not assume that any materials, with the exception of silver from the Elchem Ox process, could be recycled by off-site industries because of limitations imposed by environmental regulations and the international treaty on chemical weapons. Research has shown that it is likely that silver from chloride in the electrochemical technology system could be shipped off site for recovery. Note that a number of materials are recycled on site within the technology systems as addressed in the EIS.

Comment N-30: Other hazardous wastes are expected to be generated, since ACWAs and chemical warfare munitions are listed hazardous wastes in Colorado. Thus, the munitions bodies, brine liquids, ash, and solid salts would be listed as hazardous wastes, since they are derived from the treatment of listed hazardous wastes. [*Document 95-3*]

Response N-30: The document has been modified to reflect this comment.

Comment N-31: I am considering which of the three methods uses the least amount of material and results in the least amount of total effluent. Technology C (AEA) is the best. It results in some sodium hydroxide, which could be corrosive or toxic, but no more of it than does B and less than does A. It uses more silver nitrate and some nitric acid; both are dangerous chemicals if spilled on workers. It seems that the choice should be made on the basis of the least danger to the workers who handle the materials during routine operations. [*Document 74-2*]
Response N-31: The safety of the workers is a very important consideration. Equally important, however, is the impact on public safety and the environment from disposal of waste (primarily hazardous). Any problems in this area could affect the public for many decades and might even require remediation if problems were to occur. For example, the hazardous brine salts resulting from the use of each ACWA technology can produce material that may fail the RCRA TCLP tests for leaching of hazardous materials. Currently, it is unresolved which ACWA technology produces the most stable and safest brine waste for disposal.

Comment N-32: The statement on p. S-22 of the ACWA DEIS regarding waste management reads, "All nonprocess operational wastes would be potentially contaminated by agent and would require treatment." This statement appears to be missing from PBA's waste management section. [*Document 120-73*]
Response N-32: The appropriate statement has been added to PBA's waste management section.

Comment N-33: The text should be modified to include a statement that ADEQ must issue a RCRA permit. [*Document 120-74*]
Response N-33: See Section 9.2.4, where this issue is addressed.

Comment N-34: The high levels of toxic chemicals in the environment and our bodies make any additional release of agents or hazardous wastes "significant" [*Documents 108-3, 119-5*]
Response N-34: The EIS addresses the health impacts from the release of agents and hazardous and toxic and hazardous pollutants. Your comment on the significance of those impacts is noted.

Comment N-35: Would/could currently listed wastes from ACWA processes be delisted? [*Document 64-4*]
Response N-35: The delisting process in general is described in the sections on hazardous waste for each site discussed in the DEIS (Sections 4.4.2, 5.4.2, 6.4.2, and 7.4.2). It is further discussed for BGAD and PCD in Sections 9.2.5 and 9.2.6. However, since chemical weapons, chemical agent, and/or the residues from the treatment of chemical weapons and agents are not regulatory listed hazardous wastes in Alabama or Arkansas, the delisting process for chemical weapons and agent and the residues from the treatment of chemical weapons and agent would not be applicable. Therefore, the discussion of delisting has been removed from Sections 4.4.2 and 5.4.2.

Comment N-36: Other hazardous wastes are expected to be generated because CWAs and chemical warfare munitions are listed hazardous wastes in Colorado. [*Document 95-3*]
Response N-36: See Section 9.2.5. In addition, language has been added to address the recent amendment to the Colorado regulations to include newly listed CWA wastes.

Comment N-37: Page 4-35 of the section on Elchem Ox in the ACWA DEIS states, "The operation of this technology would involve several sources of wastes." What are those wastes? Are those wastes considered hazardous wastes? Is this technology considered a closed-loop process? Do any of those wastes have the potential to contain chemical agent or other hazardous substances? [*Document 22-47*]

Response N-37: The statement on p. 4-35, line 3 of the ACWA DEIS is incorrect and was revised to state, "The operation of this technology would generate several sources of waste." The hazardous wastes generated by the Elchem Ox technology are identified in Table 4.4-3 on p. 4-30 of the DEIS and described in the text on p. 4-35.

A closed-loop system is generally considered to be one that is completely self-sufficient, in which process effluents are recovered and/or recycled. The Elchem Ox technology would not be considered a closed-loop process.

The hazardous wastes from the Elchem Ox process would not be expected to contain chemical agent. Table 4.4-3 on p. 4-30 of the DEIS provides a list of major compounds in the various hazardous wastes generated by this technology. Further information on trace compounds is available in Kimmell et al. (2001).

Comment N-38: In the National Research Council (1999) report entitled *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons*, General Finding 1 states, "One of the crucial issues is the identity and disposition of byproducts." Has this issue been resolved? How will these by-products be disposed of? What is their impact on human health and environment? [*Document 22-56*]

Response N-38: General Finding 1 on p. 5 states in its entirety, "The chemistry of all four of the primary technologies (hydrolysis, SILVER II, plasma arc, and SET), as proposed, can decompose the chemical agents with destruction efficiencies of 99.9999 percent. However, each technology package raises other technical issues that must be resolved. One of the crucial issues is the identity and disposition of byproducts."

As stated on p. 3-18 of the ACWA DEIS, the by-products of the hydrolysis (or neutralization) of chemical agents are residual compounds that are controlled under Schedule 2 of the CWC. Secondary processes, such as biotreatment or SCWO, are required to destroy these compounds. There would be no hazardous liquid effluents from the biotreatment or SCWO technologies, since all liquids generated by the process and all liquid laboratory wastes would be reused in the process or disposed of through the secondary process.

As stated on p. 3-27 of the ACWA DEIS, solid wastes, liquid wastes, and air emissions would result from the Elchem Ox (SILVER II) process. The solid waste stream of dried salts would be containerized and treated to meet RCRA requirements for disposal. Silver chloride precipitate would be thermally treated to destroy contaminants and shipped off site for silver recovery. The specific options for disposal of a dilute nitric acid waste stream have not been identified. The DEIS assumes neutralization by using sodium hydroxide, followed by further treatment as an industrial wastewater.

On the basis of a DRE of at least 99.9999% for mustard and nerve agents for the ACWA technologies, the effluent produced would be of low concern and impact to human health and the environment.

Comment N-39: In the National Research Council (1999) report entitled *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons*, General

Finding 5 states, "The primary chemical decomposition process in all of the technology packages produce environmentally unacceptable reaction products." [*Documents 22-59, 22-60, 56-21*]
Response N-39: As stated on p. 3-18 of the ACWA DEIS, the by-products of the hydrolysis (or neutralization) of chemical agents are residual compounds that are controlled under Schedule 2 of the CWC. The reaction products are not suitable for direct discharge to the environment. Secondary processes, such as biotreatment or SCWO, are required to destroy these compounds. No hazardous liquid effluents would be produced from the biotreatment or SCWO technologies, since all liquids generated by these processes and all liquid laboratory wastes would be reused in the processes or disposed of through the secondary process.

The report referred to in the comment was published in 1999. A more recent report entitled *Evaluation of Demonstration Test Results of Alternative Technologies for Demilitarization of Assembled Chemical Weapons: A Supplemental Review* was published by the National Research Council in 2000. It states the following on p. 29: "Hydrolysis of agent (used in the General Atomics and Parsons-Allied Signal technology packages) appears sufficiently mature to consider full scale application to any assembled chemical weapons." Thus, the National Research Council considers the hydrolysis technology to be mature enough to destroy chemical weapons.

According to the 1999 National Research Council report, *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons,* because the gaseous effluent stream will be continuously monitored for hazardous materials, the release of hazardous materials is considered extremely unlikely in the event of failure. In the unlikely event that some agent was not destroyed in the neutralization process and subsequent treatment, it would be detected, and the causes would be mitigated immediately.

Comment N-40: Section 4.4 of the ACWA DEIS states, "While in storage, the ACWs are not generally considered wastes. . . ." Are the M-55 rockets not currently considered a hazardous waste? [*Document 22-38*]
Response N-40: ACWs are not generally considered wastes while in storage, but M55 rockets are an exception. This exception is addressed in Section 9 of the EIS.

Comment N-41: What are the units of measure used in Table 4.4-3? [*Document 22-7*]
Response N-41: The units for this table are tons per year, and the table has been corrected to so indicate.

Comment N-42: The ACWA DEIS indicates that there is a need to expand or build additional new lined evaporative lagoons at PCD. However, there is no information regarding the current condition of the existing lagoons and whether they meet state and local permit requirements. [*Document 96-20*]
Response N-42: The lagoons near Munitions Storage Area A were constructed in 1995; they have a total capacity of 6 million gallons. The current condition of the lined evaporative lagoons is good, and they are monitored regularly to see that they meet state and local regulations. However, under certain conditions, they might not have sufficient capacity to handle the additional load from an ACWA pilot plant. New additional evaporative lagoons would then be constructed to meet all state and local permit requirements. See Section 9.5.1.3 for additional information on required state and local regulations.

Comment N-43: The PCD DEIS and ACWA DEIS use different language in discussing future sewage treatment needs. [*Document 95-7*]
Response N-43: Existing sewage treatment systems might need to be upgraded for the waste volumes expected from an ACWA pilot plant. For all construction needed for an ACWA facility, all required local, state, and federal permits would be obtained and honored. Permits would include those for domestic sewage treatment facilities. All sewage treatment facilities would be designed and operated in accordance with existing local, state, and federal regulations.

Comment N-44: What is the current condition of waste treatment lagoons at PCD, and what pretreatment of sewage would be required for an ACWA facility? At all sites, what types of hazardous waste would be in the sewage outfalls, and how would the outfalls be treated? [*Documents 26-10, 72-2, 94-5, 94-6, 94-7, 101-15, 101-16, 112-5*]
Response N-44: For all construction and design needed for an ACWA facility, all required local, state, and federal permits would be obtained and honored. Permits would include those for the domestic sewage treatment facilities. All sewage treatment facilities would be designed and operated in accordance with existing local, state, and federal regulations. The existing sewage treatment facility at PCD operates in accordance with all applicable permits and regulations (see Section 9.5.1.3).

No pretreatment of sanitary (i.e., domestic) waste would be required, and the sewage outfall would contain no hazardous wastes. All industrial waste and industrial wastewater would be treated separately, and the residuals would be disposed of off site in permitted disposal facilities.

Comment N-45: Can the existing ANAD sewage treatment plant handle additional discharges? [*Document 22-35*]
Response N-45: The current sewage treatment plant at ANAD is being upgraded. This upgrade would be sufficient to treat the volumes of domestic waste generated by an ACWA facility, as stated in the EIS.

Comment N-46: The ACWA facility could use the City of Richmond's domestic sewage treatment facilities and water supply systems. The City of Richmond has the capacity to supply BGAD with water service and will work with the U.S. Army to do so. [*Documents 112-3, 112-4, 112-6, 112-7*]
Response N-46: The text has been changed to indicate the potential for use of the City of Richmond's utilities.

Comment N-47: In Section 7.4 of the ACWA DEIS on waste management, p. 7-27 should reference Appendix C, which discusses the methodology for assessing health risks from substances like PCBs. [*Document 115-5*]
Response N-47: This waste management section states that brine wastes from any ACWA technology treating firing tubes from M-15 rockets could contain PCBs. PCB-containing brine wastes would be stored and disposed of in accordance with applicable hazardous waste regulations (i.e., sent to a licensed facility with proven capability to safely dispose of PCB-containing wastes). No exposure to the PCBs in the brine wastes would occur. Referencing Appendix C in this section is not appropriate, because that appendix details the methodology for assessing the risks from pilot facility stack emissions.

Comment N-48: Doesn't PBA have an existing hazardous waste incinerator (see p. S-33)? It is our understanding that this RCRA incinerator will become a general solid waste incinerator. [*Document 25-7*]

Response N-48: The existing RCRA-permitted incinerator, which received a permit in 1989 and operates intermittently, is described in Chapter 5 of the ACWA FEIS. It has been added to the description of existing waste management at PBA in the Summary. The emissions from this RCRA-permitted incinerator facility are included in the background air quality and existing site emissions described for the affected environment.

O LAND USE

Comment O-1: Was the Dugger Mountain Wilderness Area considered for the ANAD assessment? [*Document 22-17*]
Response O-1: Dugger Mountain Wilderness Area is approximately 20 mi northeast of ANAD in the Talladega National Forest. This area would not be impacted by normal operations of an ACWA pilot test facility. However, activities at the Talladega National Forest and Dugger Mountain Wilderness Area might be interrupted by an accident involving a release of agent during either no action or during ACWA pilot test facility operations. The Dugger Mountain Wilderness Area has been added to the land use features identified in Sections 4.2.3 and 4.21 as an area potentially affected by an accident involving release of agent during no action or ACWA pilot facility operations.

Comment O-2: The text describing the area adjacent to PBA implies that the area is more rural than it is. The summary is not a good description of several environmental features of the area surrounding PBA. [*Documents 4-1, 70-1*]
Response O-2: Sections S.5, 5.1, and 5.2.3 have been revised to better describe the area immediately adjacent to PBA.

Comment O-3: The DEIS describes land surrounding PCD as undeveloped ranching and grazing land. It ignores the farming communities of Boone and Avondale, which are the oldest commercial agricultural settlements in Colorado. [*Document 10-2*]
Response O-3: The EIS correctly identified the land adjacent to PCD as ranching and grazing land. The EIS also identifies the location of the nearby communities of Boone, North Avondale, and Avondale and describes the importance of agriculture in the economy of the region. The EIS has been revised to assemble information related to agriculture in a new section for the FEIS.

Comment O-4: The EIS indicates that Pueblo is east of PCD; Pueblo is west of PCD [*Documents 14-2, 96-52, 120-15*]
Response O-4: Section 6.2.3 has been corrected to indicate Pueblo is located west of PCD.

Comment O-5: The two EISs should be in agreement on the date that PCD was established. The ACWA EIS says 1942, the PMCD EIS says 1943. [*Document 26-8*]
Response O-5: The Soldier and Biological Chemical Command (SBCCOM) web site states that construction of the facility began in February 1942 and that the first shipments were received in August 1942.

Comment O-6: The Transportation Technology Center (TTC; north of PCD) is sited on land owned by the state and leased to the Federal Railroad Administration. The TTC is a subsidiary of the Association of American Railroads. [*Document 26-26*]
Response O-6: These changes have been made in Section 6.2.3.

Comment O-7: On p. 5-7, the paragraph concerning the central incinerator complex should mention that the complex is being upgraded to meet the maximum achievable control technology (MACT) rule. [*Document 120-77*]
Response O-7: This information was added to the ACWA FEIS.

P AIR QUALITY

Comment P-1: Page 6-66 of the ACWA DEIS suggests that a 1995 version of ISCST3 might have been used in the modeling, but Appendix B states that the most recent version (dated 00101) was used. The Division normally recommends that the most recent version be used. [*Document 95-18*]
Response P-1: In fact, the latest version of the ISCST3 model (dated 00101) was used in our modeling. The text has been revised to eliminate confusion.

Comment P-2: We are comfortable with the Kentucky Department of Natural Resources air quality permitting process, and we generally agree with the comments on the air quality section of the EIS made by the Kentucky Environmental Foundation. [*Document 112-10*]
Response P-2: Comment is noted.

Comment P-3: Table 4.5-1 does not reflect the current permitted sources at ANAD. [*Document 22-16*]
Response P-3: Table 4.5-1 represents data on the permitted sources and their emissions that were supplied by ANAD for use in the EIS. Neither ANAD, the State of Alabama, nor the EPA identified additional permitted sources in their reviews of the ACWA DEIS.

Comment P-4: Page 5-47 of the ACWA DEIS states that the pilot facility would be subject to the entire *Clean Air Act* because PBA is a major source. This statement conflicts with text on p. 5-70 which states that the pilot facility would not be a major source, and, therefore, no regulatory action would be necessary. [*Document 120-75*]
Response P-4: PBA is a major source and should comply with the requirements of the *Clean Air Act Amendments.* However, the ACWA facility is not a major source for hazardous air pollutants (HAPs) and does not need to meet the regulatory criteria of the National Emission Standards for Hazardous Air Pollutants (NESHAP) (see Chapter 9 of the ACWA DEIS).

Comment P-5: The reports assume that the Colorado ambient air quality standards are identical to the federal ones. With the 1997 promulgation of new federal standards for particulate matter with a mean aerodynamic diameter of 10 μm or less (PM_{10}) and ozone, this is no longer true. The Colorado state standards for PM_{10} and ozone are identical to the pre-1997 federal ones. Colorado has stricter standards for sulfur oxide. Colorado Regulation 8 contains a lead standard (1.5 $\mu g/m^3$ for a one-month average) that is stricter than the federal one. (The federal lead standard specifies a quarterly average). [*Document 95-2*]
Response P-5: The text has been revised as suggested.

Comment P-6: The map on p. 6-46 of the ACWA DEIS shows air quality control regions in Colorado. However, the Colorado Air Pollution Control Division recognizes 13 air quality control regions that differ from those shown here on Figure 6.5-2. [*Document 95-13*]
Response P-6: The figure has been revised as suggested.

Comment P-7: The title of Table 6.5.3 on p. 6-48 is, "National Ambient Air Quality Standards, Colorado State Ambient Air Quality Standards, and Highest Background Levels Representative

of PCD." The table needs to add Colorado standards for ozone, sulfur dioxide, PM_{10}, and lead. Also, it would be better if the table title ended with "Highest Background Levels in Urban Areas near PCD." Many of the levels listed in this table come from downtown Colorado Springs and do not represent air pollutant concentrations off the immediate borders of PCD. [*Document 95-14*]
Response P-7: Concentration levels in Colorado Springs may not represent those at the PCD boundaries and are possibly overly conservative. The text has been revised as indicated in the comment.

Comment P-8: Page 7-54 of the ACWA DEIS states, "Short-term increments for all four ACWA technologies would be almost the same." However, there are significant differences in the numbers and quantities of estimated toxic air pollutant emissions shown in Tables 7.6-2, 7.6-3, 7.6-4, and 7.6-5 (pages 7-63 through 7-75) and the total concentrations of criteria pollutants shown in Tables 7.5-10 through 7.5-13 (pages 7-55 through 7-58). Significant differences in one type of emission would seem to negate their being "almost the same" for other types of pollutants. [*Document 115-8]*
Response P-8: Concentration increments associated with ACWA facility operations are predicted to be negligible for all four ACWA technologies for criteria pollutants only (Tables 7.5-10 through 7.5-13). Thus, the text will be revised to limit this assessment conclusion to criteria air pollutants only.

Comment P-9: With regard to p. 4-51 of the ACWA DEIS, what are the emission rates of the criteria pollutants from the process stacks at these facilities? The tables do not list any emissions from the process, while the text says there are some. [*Document 22-19*]
Response P-9: Table 4.5-4 on p. 4-51 provides the emission rates of criteria pollutants and VOCs from the steam boilers and emergency diesel generators used in the Neut/Bio technology. As stated on line 6 on p. 4-55, the process gas burner stack for the Neut/GPCR/TW-SCWO pilot facility would emit criteria pollutants. The emissions of criteria pollutants from the process gas burner stack are listed in Table 4.5-6 on p. 4-53 of the ACWA DEIS.

Comment P-10: Page 5-59, line 11 states that the "emission of lead. . .would be negligible. . . ." This statement must be verified by stack testing, and other metals should be addressed as well. [*Document 120-78*]
Response P-10: Comment is noted. However, p. 5-59 also states, "Lead (Pb) is the only metal among criteria pollutants. Expected emissions of lead from the proposed facility are too small to quantify." Emissions of other metals are addressed in a subsequent section of the ACWA EIS.

Comment P-11: With regard to p. 7-59 of the ACWA DEIS, lines 6–8 on lead emissions, please explain what happens to the lead contained in the munitions if emissions of this material are considered "negligible." [*Document 115-9*]
Response P-11: ACWA technologies are different from the baseline incinerator technology in that in an ACWA technology, the munition parts that might contain lead would be separated out at the initial disassembly stage and treated or disposed of in such a way that there would be zero or negligible lead air emissions.

Comment P-12: Large amounts of data are missing, the information is complex, and it is difficult to compare the ACWA DEIS with the PCD EIS. There should be a comprehensive chart

that lists all emissions from all sources for all technologies and provides the amounts in standard American figures, including tons per year. [*Documents 23-5, 29-1, 96-71*]

Response P-12: The ACWA EIS does not address incineration, nor does it compare incineration with ACWA technologies. For that comparison, see the PCD EIS. Further information on air emissions from activities associated with the construction and operation of ACWA facilities is available in the TRD (Kimmell et al. 2001). All tables on air emissions use units of measure that are compatible with regulatory limits.

Comment P-13: With regard to p. 7-59, lines 8–10, on the production of ozone, please explain why this process cannot be "accurately quantified." Is the scientific capability lacking or were the data on the contributors to ozone production missing from the information on ACWA technologies provided to ACWA? [*Document 115-10*]

Response P-13: Ozone is a secondary pollutant. It is not emitted directly from typical emission sources but is formed in ambient air by highly complex and nonlinear photochemical reactions that involve ozone precursors (nitrogen oxides and VOCs) mostly from vehicle exhaust, power plants, and industrial operations. Moreover, ozone, once formed, and its precursors can be transported downwind over long distances and undergo further chemical reactions. This makes it difficult to relate ozone concentrations to specific sources of precursor emissions. In addition, reactive VOCs emitted by vegetation play an important role in producing ozone at downwind locations. Therefore, accurate predictions of ozone levels cannot be made by using the Gaussian or Lagrangian models. To accurately predict ozone levels, large amounts of input data (three-dimensional [3-D] meteorological data, land use/land cover data, topographical data, emission inventory data, etc.) and use of the 3-D Eulerian Transport/Chemistry/Deposition Model (e.g., Urban Airshed Model) are needed. Because the emissions of ozone precursors from ACWA technologies are relatively small in comparison with other urban and industrial emissions from nearby communities, contributions of ozone levels from ACWA technologies are estimated to be negligible, and the use of extensive resources to conduct such modeling is not warranted.

Comment P-14: Page 4-63 of the ACWA DEIS states that carbon monoxide (CO) and PM concentrations are near their levels. Does this statement consider that the baseline technology is in place? [*Document 22-21*]

Response P-14: The referenced statement indicates that the potential 8-hour concentrations of particulate matter with a mean aerodynamic diameter of 2.5 μm or less ($PM_{2.5}$) during ACWA operations would be close to, but below, applicable standards. The monitored, maximum background concentrations used in this calculation do not include operation of the new incinerator at ANAD. The air quality impacts from an ACWA facility plus the incinerator facility are discussed in the cumulative impacts section, Section 4.22.5.

Comment P-15: So far, in the brief review of the ACWA DEIS that I have been able to conduct, I am concerned that carbon dioxide (CO_2) and $PM_{2.5}$ need more in-depth modeling and projections, with detailed attention given to micro climate wind analysis in the site-specific area. The macro climate water scale wind projections can really be inaccurate for the particular foothills/plains combination here (PCD), and it can result in some very (and a closer analysis can result in some significant) differences from what prevailing notions of prevailing winds might lead one to project. Bear in mind that the PCD EIS doesn't appear to mention $PM_{2.5}$ at all, and at

least the ACWA DEIS does mention it. But I think better modeling and more recent information on that subject need to be brought into the EIS. [*Document 36-3*]

Response P-15: CO_2 is known as a greenhouse gas, but it is neither a criteria nor a toxic air pollutant. Therefore, CO_2 was not modeled for the ambient air quality impact assessment. Air quality modeling analysis for $PM_{2.5}$ used the most appropriate near-field dispersion model recommended by the EPA, and it used data from the PCD on-site Demil meteorological tower, which meet the EPA's siting criteria and undergo quality assurance/quality control (QA/QC) procedures.

Comment P-16: I would like an analysis of $PM_{2.5}$ emissions using the current information available, with the consideration that our high altitude and abundance of sunlight make it easier for PM to accumulate and linger. [*Document 107-2*]

Response P-16: The most recent emission factors for $PM_{2.5}$ from the EPA database were used for the analysis. High altitude and abundant sunlight do not significantly contribute to causing fine particulates to accumulate and linger.

Comment P-17: In Section 2 of the ACWA DEIS, in Table 2.7-3 on p. 2-27, under "air quality — criteria pollutants" and "toxic air pollutants," there are claims of "negligible impacts." These claims are not supported by data quoted in the ACWA DEIS or the TRD (Kimmell et al. 2001). [*Document 77-7*]

Response P-17: The table cited is a summary impact table. More complete discussions of the analyses that were conducted and the conclusions are found in the criteria pollutant sections (4.5, 5.5, 6.5, 7.5), toxic air pollutant sections (4.6, 5.6, 6.6, 7.6), and human health and safety sections (4.7, 5.7, 6.7, and 7.7). However, the analyses do support the findings of negligible impact for these areas. The criterion used to measure the significance of adverse impacts for criteria air pollutants is whether they exceed the National Ambient Air Quality Standards (NAAQS). When the modeling of emissions shows that the NAAQS are not exceeded (and, in fact, ambient levels would be well below the NAAQS), then the conclusion is that the impacts are negligible. Similarly, if toxic air pollutant emissions are lower than levels that would be regulated under EPA NESHAPS, then toxic emissions can be considered negligible. However, the ACWA EIS also assessed noncancer and cancer risks to on-site and off-site persons who might inhale the emissions (including emissions that are higher than usual due to fluctuating facility conditions). These risks were also found to be well below threshold levels that are generally considered indicative of serious risk. Therefore, the conclusion that the impacts on air quality from toxic air pollutant emissions would be negligible or low is justified.

Comment P-18: Regarding emissions, in both the PCD DEIS and ACWA DEIS, the Army indicates that no significant impact will result from the construction or operation of the facility because the emissions from the facility will not be above the limits set by the State of Colorado. This conclusion is misleading, since adverse impacts can and do occur even when emissions levels fall within set limits. [*Document 96-17*]

Response P-18: For all four ACWA technologies, not only would air emissions be below the limits set by the State of Colorado, but also the ambient air quality (predicted concentration increments plus background concentration) would be well below the ambient air quality standards (see Tables 7.5-10 through 7.5-13). Thus, no significant air quality impacts would be expected.

Comment P-19: Consideration should be given to curtailing certain operations that create criteria pollutants and their precursors during ACWA operations. ACWA technology operations should be conducted in such a way that emissions are kept to a minimum. This should be true no matter what the annual emissions are for the county or installation. Concerning "stacks," the technologies are referenced with no mention of air pollution abatement. Please clarify. [*Documents 108-5, 108-7, 108-8, 115-6, 115-7, 119-7, 119-8, 119-9*]

Response P-19: ACWA technology operations will use the best available control technology to minimize emissions of criteria and toxic air pollutants (see Section 3.3.9 of the ACWA EIS).

Q AIR QUALITY — TOXIC AIR POLLUTANTS

Comment Q-1: The EIS should publish a table comparing the air emissions and associated human health effects from all technology systems. The comparison table should include air emissions for HAPs of concern, such as mercury, cadmium, and lead, the more toxic of the dioxins, and other pollutants of concern. The toxicity equivalents for dioxins and furans should be developed to compare air emissions for each of the technologies. These comparison tables should also include the criteria pollutants for air and VOCs. [*Documents 29-13, 40-11, 40-12, 102-2, 106-8, 120-1, 120-7, 135-1, 135-7*]

Response Q-1: The air emissions data for criteria pollutants are presented in comparative format for all four ACWA technologies in the ACWA EIS. The results of human health effects assessments are also presented in comparative format for all four ACWA technologies in the ACWA EIS. However, the emissions of toxic air pollutants are provided for each technology separately. The tables containing these data were examined, and no reasonable way was found to summarize the emissions information across all technologies. Because the different technology systems are based on different chemical and treatment processes, the lists of emissions are only partially similar. In addition, the degree of specificity in the lists of chemicals analyzed for during demonstration differed for each technology. While a simplified comparison table of toxic air pollutant emissions is desired by the commentors, the nature of the data do not support the preparation of such a table.

Comment Q-2: Comparisons of certain pollutants between technologies reflect significantly higher quantities of certain emissions of particular concern (i.e., PCBs and TCDDs) from Neut/GPCR/TW-SCWO (Table 4.6-4) than from the other ACWA technologies. This difference could be technology-specific, related to processing (during nerve agent processing, Neut/SCWO shows PCB emissions at 1.5×10^{-9} μg/s while Neut/GPCR/TW-SCWO shows PCB emissions at 9.6×10^{-2} μg/s). Since both are Neut/SCWO technologies, explain the differences in the emissions for PCBs for each process. [*Documents 108-11, 115-13, 119-12*]

Response Q-2: The reason for the difference in the estimated emission values for PCBs is that, based on available vendor data, the assessment for the Neut/SCWO process assumes that the SCWO vent would be equipped with six carbon filters in series, whereas the assumption for the Neut/GPCR/TW-SCWO process is that the product gas burner would not be equipped with carbon filters. Even without assuming carbon filtration, the emission rate for PCBs would be about 2.5 lb/yr, with a very low associated increased cancer risk of less than 10^{-12}.

Comment Q-3: Tables show significantly greater numbers of toxic pollutants from the Neut/GPCR/TW-SCWO technology than from the other ACWA technologies. Is the increased number of emissions the result of it being a different process or the result of having more detailed information for this technology than for the other options? [*Documents 108-9, 108-10, 115-12, 119-10, 119-11*]

Response Q-3: The substances listed as being potentially emitted to air from the ACWA technologies are the substances that were detected during demonstration testing of each technology. The maximum concentration of each substance detected was used to estimate potential emissions. The level of information was the same for the Neut/GPCR/TW-SCWO technology as for the other technologies; during demonstration testing of off-gases, more

substances were detected for that technology than for the other technologies. However, estimated emissions for each technology should only be considered indicative of potential emissions from the complete system.

Comment Q-4: I've got questions about the ACWA DEIS with regard to the Neut/Bio process and emissions. Someone told me today that it actually emits more dioxins. If this is correct, how much more? [*Document 50-2*]
Response Q-4: It is unclear to which technology the dioxin emissions from the Neut/Bio technology are to be compared. Estimated toxic air pollutant emissions from the Neut/Bio technology at PCD are listed in Table 6.6-1 on page 6-60 of the ACWA DEIS. Dioxin emissions are projected to be on the order of 1×10^{-14} to 1×10^{-9} μg/s, similar to the dioxin emissions listed in Table 6.6-2 on page 6-63 for the Neut/SCWO technology.

Comment Q-5: In comparing the same two technologies, there appears to be a significant difference in mercury emissions as a result of operating the boiler(s) for each. The Neut/SCWO table shows boiler mercury emissions at 5.2×10^{-1} μg/s, and the Neut/GPCR/TW-SCWO table shows boiler mercury emissions at 9.4×10^{-1} μg/s, almost twice the amount of the former option. Please explain this disparity. [*Documents 108-12, 115-13, 119-13*]
Response Q-5: The emissions of mercury and other HAPs from the boilers were estimated on the basis of the annual consumption rates of natural gas shown in Tables 3.4-1 through 3.4-4 on pages 3-22 to 3-25 in the ACWA DEIS. Emission factors for large wall-fired boilers were multiplied by the natural gas consumption rate for a given ACWA technology and site to arrive at emission rates for mercury and other HAPs. The difference in mercury emissions between the two technologies is due to the higher consumption of natural gas by the Neut/GPCR/TW-SCWO technology compared with the Neut/SCWO technology.

Comment Q-6: The three technology alternatives that are applicable for VX treatment show varying amounts of VX emissions leaving the filter farm stack, ranging from 2.8 to 3.7 μg/s. Although footnoted as a "worst-case estimate" (at the detection limit), these data raise concerns about the capability of the technologies to contain VX agent. Please provide VX emission data for normal operations and explain conditions under which "worst-case scenario" VX emissions at the levels cited could occur. [*Documents 108-13, 115-14, 119-14*]
Response Q-6: The VX emissions were estimated by multiplying the stack gas flow rate by the allowable stack concentrations for each chemical agent. Actual agent emissions are expected to be below detection limits at all times. However, in order to be conservative, and to determine if potential chemical agent stack emissions would cause adverse effects, hypothetical emissions were estimated on the basis of an assumed chemical agent concentration in the stack exhaust gases that would be equal to 20% of the allowable stack concentration (ASC) recommended by the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

With regard to operating experience, the *Supplemental Report to Congress, June 2001* (PMACWA 2001) reports that chemical agents were destroyed by the ACWA technologies to "six nines," that is, to 99.9999%; energetics were destroyed to 99.999%, a level that also meets performance objectives. HD, GB, and VX were not detected in any process stream exiting the ACWA technologies.

A "worst-case scenario" could include situations such as a VX leak into the ventilation system of the munitions demilitarization building (MDB) during munitions processing or inadequate neutralization of the VX extracted from the chemical weapons. These situations are expected to be extremely unlikely.

Comment Q-7: Table 6.6-1 on p. 6-60 of the ACWA DEIS estimates that dioxin compounds and other organic compounds from incomplete treatment will be present in the filter farm stack for the Neut/Bio process. Why are these organic compounds not assumed to be present in the filter stack for the Neut/SCWO process (Table 6.6-2 on p. 6-63)? The ACWA FEIS should explain the difference in air emissions between these two alternatives. [*Document 120-23*]
Response Q-7: During the demonstration tests conducted to evaluate promising ACWA technologies, major feed materials, intermediates, and final products and effluents were analyzed for various compounds, including residual agent (if any), Schedule 2 compounds, acetates, formates, VOCs, anions, chemicals, metals, cyanides, energetics, and semivolatile organic compounds (SVOCs). All analytical data were entered into a centralized database to track sample collection, transfers between the field and analytical laboratories, and the distribution of the analytical data to designated ACWA program members. A review of this database did not indicate the presence of dioxin compounds and other organic compounds for the Neut/SCWO technology.

The lack of organic compounds in the air effluent from the Neut/SCWO technology compared with the Neut/Bio technology may be due to differences in the operating conditions for the two technologies. When SCWO is used, the temperature and water pressure are raised to above supercritical conditions, at which salts precipitate out of solution and organic compounds oxidize to CO_2 and water.

Further information on the estimated generation rates of final products and effluents for the Neut/Bio and Neut/SCWO technologies is provided in Mitretek (2001a,b).

Comment Q-8: On p. 4-65 of the ACWA DEIS, what are the emissions from the entire plant? The emissions from the generators are compared to emissions from the plant. There may be more net emissions from the plant. [*Document 22-24*]
ResponseQ-8: The emissions presented in this section are for the entire pilot test facility. As stated, for many substances, the estimated emissions from generators and boilers would be greater than emissions from agent destruction processes.

Comment Q-9: The projections of air emissions are not well defined. An Army spokesperson said that the dioxin emissions were still being calculated and that it was thought that Neut/Bio would have higher dioxin emissions than would incineration. The EIS needs to include the final estimates. [*Documents 120-5, 135-5*]
Response Q-9: The ACWA FEIS includes revised estimates based on additional analysis of ACWA technology demonstrations. The air quality modeling was based on the best information currently available for Pueblo.

Comment Q-10: In Volume 4, Section 4.3.2.3.4, p. 68 et seq. of the TRD (Kimmell et al. 2001), the estimated emissions in Tables 4.21, 4.22, 4.46, 4.47, and 4.48 appear to be derived from taking allowable emissions and calculating backward rather than from emissions observed in

actual experiments. Have these values been demonstrated as being achievable under processing conditions? Where are the operating data? [*Document 77-19*]

Response Q-10: The values provided in Tables 4.21, 4.22, 4.46, 4.47, and 4.48 are emission rates estimated by multiplying the stack gas flow rate by the allowable stack concentrations for each chemical agent. Actual agent emissions are expected to be below detection limits at all times. However, in order to be conservative, and to determine if potential chemical agent stack emissions would cause adverse effects, hypothetical emissions were estimated on the basis of an assumed chemical agent concentration in the stack exhaust gases that is equal to 20% of the ASC recommended by the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

With regard to operating experience, the *Supplemental Report to Congress, June 2001* (PMACWA 2001) reports that chemical agents were destroyed by the ACWA technologies to "six nines," that is, to 99.9999%; energetics were destroyed to 99.999%, a level that also meets performance objectives. HD, GB, and VX were not detected in any process stream exiting the ACWA technologies.

The filtration system is composed of a standard particulate filter, a high-efficiency particulate air (HEPA) filter, six carbon filters, and a final HEPA filter. The removal efficiency for organic compounds, including chemical agents, depends on the carbon filters and is approximately 99.999998%, assuming a conservative value of 95% VOC removal efficiency for each carbon filter. The filtered exhaust gases would be monitored continuously for agent.

The overall removal efficiency of chemical agents by the ACWA technologies would therefore be on the order of 99.999999999998%, or below detection limits. A conservative estimate of the chemical agent emission rates was therefore assumed in the analysis.

Footnotes e in Table 6.61 and d in Table 6.6-2 on pages 6-62 to 6-64 of the ACWA DEIS indicate that no agent "would be emitted. . .; none would be present after neutralization and. . . treatment."

Comment Q-11: The ACWA DEIS indicates that "PCD does not currently emit any reportable quantities of HAPs. . . ." However, this statement is not completely accurate. Not only does PCD report pollutants from the *Clean Air Act* 112 list (regardless of quantity or threshold requirements), but PCD also reports pollutants found on state lists. Indicating otherwise might be misleading. Pollutants that are reported should include, in no particular order, mustard agent, benzene, methylene chloride, chlorine, lead compounds, antimony compounds, manganese compounds, nickel compounds, and hydrogen cyanide. Other pollutants might be reportable on the basis of the most recently revised permit for PCD. This should be verified for final EIS release (Section 6.6.10). [*Document 95-20*]

Response Q-11: Section 6.6.1 has been revised to summarize the 1994 HAP emissions from PCD's Final Synthetic Minor Permit of 1995. Contacts with PCD Environmental Division staff confirmed that emission estimates for subsequent years are not available, but the HAP emissions have decreased since that time.

Comment Q-12: Regarding HAPs and NESHAP regulatory action, please provide the quantities of HAPs specifically related to the toxic pollutants emitted via the alternatives under consideration that would trigger NESHAP regulatory action. [*Documents 108-14, 115-15, 119-15*]

Response Q-12: As stated in Section 9.3.1.1 on ACWA facility operations, none of the pilot facilities would be a major source of HAP emissions (e.g., emit more than 10 tons/yr of any HAP or 25 tons/yr of any combination of HAPs) or fall under any of the EPA NESHAP-regulated source categories, as adopted by the Alabama Department of Environmental Management (Administrative Code R. 335-3-11; 40 CFR 61), which would include only certain listed HAPs (e.g., beryllium, mercury, radionuclides, benzene, asbestos, and vinyl chloride) or very specific, listed source categories or industries (synthetic organic chemical manufacturing, dry cleaning facilities, coke oven batteries, electroplating and chromium anodizing tanks, etc.).

Comment Q-13: In the ACWA DEIS, Section 6.6.2, Tables 6.6-1 and 6.6-2 on pages 6-60 to 6-64, the emission values appear to be assumptions fabricated from thin air just to show that the processes can operate within EPA and Colorado Department of Public Health and Environment emission limits. Where are actual results from bench-scale experiments? [*Document 77-10*]

Response Q-13: Environmental releases from the potential pilot plant operations for each location have been estimated by combining technology-specific, site-specific stoichiometric mass balances (which were initially developed for the ACWA Technical Evaluation Team during the preliminary evaluation phase of the technology demonstration to provide estimates of primary components in feeds, process, and effluent streams) with analyses of samples of selected unit operation process streams and effluents (which were collected during demonstration tests to provide estimates of concentrations of additional trace constituents in the effluent streams).

Demonstration tests have been conducted to evaluate promising ACWA technologies. During the tests, major feed materials, intermediates, and final products and effluents were characterized and analyzed for various compounds, including residual agent (if any), Schedule 2 compounds, acetates, formates, VOCs, anions, chemicals, metals, cyanides, energetics, and SVOCs. All analytical data were entered into a centralized database to track sample collection, transfers between the field and analytical laboratories, and the distribution of the analytical data to designated ACWA program members. Gas sample concentration values were then determined by dividing the analyte mass reported from the analytical laboratory by the sample volume (converted to units of dry standard cubic meters) reported from the process gas-sampling contractors.

Further information on the estimated generation rates of final products and effluents is provided in Mitretek (2001a,b).

The management of off-gas from the pilot facility would involve the continuous removal of organic compounds from the air effluent streams by solid activated carbon filters. The “break point” is the time when the air effluent concentration is no longer reduced by carbon filtration (due to saturation). “Breakthrough” is the period of time up to the break point. Off-gas management will be addressed during the EDS phase for each technology. However, the off-gas management strategy for each ACWA technology can be expected to employ multiple, redundant carbon filter banks. If breakthrough of a HAP were to be detected in the first of a series of carbon filters, vent gas would be redirected to one of two backup beds, and the spent carbon bed would be replaced.

Note that the various ACWA technologies would treat the spent carbon filter material after breakthrough, so that a spent carbon waste stream that would require off-site treatment would not be generated.

Information on catalytic unit oxidation (CatOx) operations during ACWA technology demonstration is available in the *Supplemental Report to Congress, June 2001*

(PMACWA 2001) and in the document entitled *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons* published by the National Research Council in 1999.

Comment Q-14: Table 4.6-2 on p. 4-67 of the ACWA DEIS does not indicate where the fluorine as part of the GB molecule would go. While hydrogen fluoride is extremely soluble and will probably drop out in the chemical oxidation process, there may a potential for fugitive emissions. The table also does not shown any intermediate fluorinated organic compounds analogous to chlorine (e.g., HxCDD). [*Document 120-54*]
Response Q-14: Table 4.6-2 provides estimated toxic air pollutant emissions from Neut/Bio of the mustard inventory at ANAD. The Neut/Bio technology has not been validated for nerve agents such as GB, and treatment of nerve agents by this technology is not considered in the ACWA EIS.

Comment Q-15: Table 6.6-2 on p. 6-63 of the ACWA DEIS lists estimated emission values for total HpCDF and TCDD, but estimates of individual congeners of HpCDF and TCDD are not listed. Do dioxin congener data exist for emissions from the Neut/SCWO process? [*Document 120-25*]
Response Q-15: Further information on the estimated generation rates of final products and effluents is provided in Mitretek (2001a,b). Individual dioxin congener data do not appear to exist for emissions from the Neut/SCWO process; only emission values for total HpCDF and TCDD exist.

Comment Q-16: Footnote e on p. 4-71 of the ACWA DEIS states that PCB destruction was assumed to be 99.9999%. Are there any data to lead one to expect these processes to destroy PCBs? [*Document 22-27*]
Response Q-16: These data are provided in Section 4.6.3.2. Pentachloraphenol, a chlorinated substance similar to PCB, was used in the ACWA technology demonstrations.

Comment Q-17: Table 6.6-1 on p. 6-60 and Table 6.6-2 on p. 6-63 of the ACWA DEIS appear to be based on the assumption that each of six banks of carbon filters in series would be able to achieve 95% removal efficiency, thus providing a system removal efficiency (SRE) of 99.999998%. This assumption appears to be overly optimistic. What documentation was used to support such a high SRE for organic compounds using carbon filters and for PM using HEPA filters? Has the Army demonstrated this level of SRE for the carbon filters used at the baseline incineration facilities? How was the SRE for dioxin compounds calculated, since SREs are assumed for organics and PM (using the HEPA prefilters)? [*Document 120-24*]
Response Q-17: The carbon filters are assumed to have 95% removal efficiency for VOCs. This assumption is based on p. 2-9 of the document entitled *Preliminary Assessment of Health Impacts for the Newport Chemical Agent Disposal Facility, Newport, Indiana* (U.S. Army Center for Health Promotion and Preventive Medicine 1999). This document also states that design calculations suggest a 99% VOC removal rate for each carbon filter, although a more conservative value of 95% VOC removal is applied in the risk analysis.

A removal efficiency of 99.97% was assumed for particulates entering a single HEPA filter, also on the basis of the above-cited document.

It is not known whether the Army has demonstrated this level of SRE for the carbon filters used at the baseline incineration facilities. However, given the differences in operating conditions and final products between baseline incineration and the ACWA technologies (e.g., incineration produces fine, carbonaceous particulates, which are not produced in the ACWA technologies), VOC removal efficiencies for baseline incineration may not be directly comparable with those for the ACWA technologies.

The SRE for dioxin compounds was calculated by assuming two HEPA filters in series, each with a removal efficiency of 99.97%. The SRE for dioxins is 99.999991%.

Comment Q-18: Section 4.5.3.3 of the ACWA DEIS is titled "Impacts of Fluctuating Operations." Isn't this another way of stating that a process is not well understood or out of control? Does this facility have the potential to emit organic compounds? Does it have the potential to emit chemical agent? [*Documents 22-52, 56-14*]

Response Q-18: This section acknowledges that emissions during start up and shutdown could differ from those measured during stable operations. This situation is not unusual in any process and is addressed for the ACWA systems. It primarily affects the nonagent facilities, such as the heating plant. All agent operations would be performed within additional controls to reduce any chance of an agent release under any circumstance. However, the potential release of agent is addressed in Sections 4.6.3, 5.6.3, 6.6.3, and 7.6.3.

Comment Q-19: On p. 7-61, lines 2 and 3, concerning releases of dinitrotoluene, Table 7.6-1 lists the amount of dinitrotoluene emitted at BGAD as a result of open burning and open detonation. Tables 7.6-2 through 7.6-5 do not show any dinitrotoluene emitted from ACWA chemical weapons processing. Are any of the substances listed in Tables 7.6-2 through 7.6-5 by-products of the ACWA treatment of explosives and energetics containing dinitrotoluene? If so, which ones? Are the emissions of toluene listed in Tables 7.6-2 through 7.6-5 a result of the treatment of dinitrotoluene contained in the chemical weapons at BGAD? [*Document 115-11*]

Response Q-19: The substances listed as potentially emitted to air from the ACWA technologies in Tables 7.6-2 through 7.6-5 are the substances that were detected during demonstration testing for each technology. For some technologies, energetics hydrolysis was included in demonstration testing, off-gases were analyzed, and results were reported as part of the demonstration test data (Mitretek 2001 a-d). The estimated emissions for each technology should be considered only indicative of potential emissions from the complete system.

Comment Q-20: For hazardous air pollutants, the information is not sufficient to adequately review the modeling methods and assumptions. Definite conclusions are not possible, as they are with criteria pollutants. It does not appear that any deposition rate modeling was done. Actual limits are set within HAP permits and should be cited. Permit 95-PB901 should also be referenced as the existing PCD air permit. [*Documents 95-17, 95-19*]

Response Q-20: All modeling methods and assumptions for hazardous air pollutants are described in Appendix B for criteria pollutants. For health effects from inhalation, released pollutants are assumed to remain airborne. A new section has been added to the EIS addressing risks to ecological systems and agriculture from deposition of hazardous air pollutants. A discussion of PCD's synthetic minor permit has been added to the FEIS Section 6.6.1.

R HUMAN HEALTH AND SAFETY

Comment R-1: With regard to p. 5-24 of the ACWA DEIS, Table S.4-1 on air quality, toxic air pollutants, operations, and the no action alternative, it is debatable that "any vapor" from a spill "would likely be contained in the igloo." Highly volatile agent, such as GB, would probably not be completely contained unless the igloo was outfitted with positive engineering containment provisions. Also, why doesn't this evaluation acknowledge possible catastrophic events involving continued storage (no action)? It is the Centers for Disease Control and Prevention's understanding that the greatest potential community risk to agent exposure is associated with continued agent storage. [*Document 25-5*]

Response R-1: Tables S.4-1, S.5-1, S.6-1, and S.7-1 summarize the impacts of the alternative technologies and the no action alternative under normal operations, which would include leaking munitions inside igloos under the no action alternative. Although it is true that GB agent spilled onto the igloo floor from a leaking munition might not be fully contained in the igloo, "the amount of agent that might spill from a leaking munition would likely be small" (see p. S-24). This is true because igloo monitoring is frequent, air flow within the igloos is minimal, and releases from leaking munitions are generally slow. Therefore, agent volatilized from leaking munitions would be detected inside an igloo before any significant release to the outdoors.

Comment R-2: What is the total number of workers proposed to construct this facility? Although the numbers used by ACWA in estimating injuries and fatalities are present (i.e., the average hours per full-time employees per year), no consideration is given to the amount of overtime required or the number of days worked without a day off. Both can have a major effect on the amount of work-related injuries or deaths. The EIS does not make reference to the experience of the work force and/or the contractor or contractors, nor does it address the number of local unionized workers who would be used during construction. [*Documents 96-40, 96-41, 96-42, 96-43*]

Response R-2: The methodology for estimating worker injuries and fatalities is summarized in Section 6.7.2.1 of the ACWA DEIS. The method is based on U.S. industrywide statistics for construction and manufacturing. In estimating injuries and fatalities that would be associated with each alternative technology, no distinction was made among categories of workers (e.g., supervisors, laborers), because the available fatality and injury statistics do not provide rates for the separate categories, only for the industry as a whole. The rates provided are averages for the whole group of construction and manufacturing workers, including supervisors, and since they are annual rates, they presumably also include workers who put in overtime. Therefore, in a general sense, these issues are included in the rates used to estimate expected injuries and fatalities for each ACWA technology. Data are not available to factor in the experience of the work force in the estimates. It must be presumed that on average, the construction and operation work forces for the ACWA technologies will have experience similar to that of the overall U.S. construction and manufacturing work forces and will work similar amounts of overtime.

Comment R-3: Section 6.7.2.2 of the ACWA DEIS states that operations will require 635 FTEs (full-time employees) per year, and it also states that the number will be a mix of government and contractor employees. How many of each? [*Document 96-45*]

Response R-3: As stated in Section 4.3.2.3.3 of the TRD (Kimmell et al. 2001), 465 contractor employees would be required for plant operations and 170 government employees would be required for munition handling, security, oversight, and other support activities.

Comment R-4: Appendix C, which describes the methodology for assessing health risks, should be referenced in the sections for each installation in the ACWA EIS. [*Documents 108-4, 119-6*]
Response R-4: This reference has been added to Sections 4.7.2, 5.7.2, 6.7.2, and 7.7.2.

Comment R-5: The Army should publish a table comparing the air emissions and associated human health effects from all technology systems. [*Documents 30-2, 30-3, 40-11, 40-12*]
Response R-5: Tables 4.7-2, 5.7-2. 6.7.2, and 7.7-2 in the ACWA DEIS compare data on hazardous air emissions from routine operations and the potential impact on human health and safety for all four ACWA technology systems.

Comment R-6: Safety and health information on the ACWA processes is limited. The EIS should acknowledge this, provide as many comparisons and as much data as possible, and describe how the missing data will be gathered, published, and evaluated. Comparison tables should be provided, and the basis of the data should be noted. [*Documents 102-2, 120-1, 135-1*]
Response R-6: ACWA is performing additional EDSs that will define requirements for health and safety-related information. The EIS was developed by using the most current data on the technologies that were available at the time of impact analysis. Because the technologies are undergoing development and testing, there was no operational health and safety data for the systems being assessed. Throughout the ACWA EIS, the preliminary nature of such data is identified, and the results are identified as worst-case or reasonably conservative. Also, when an ACWA facility is permitted and pilot tested, additional information related to health and safety will be generated. Should the pilot test be successful, additional environmental, health, and safety analyses may be required. Such studies and analyses are outside the scope of this EIS. The technology alternatives, including their health and safety impacts, are compared in the summary and in Section 2.7. Assessments of the health impacts of toxic emissions are presented in Tables 4.7-2, 5.7-2, 6.7-2, and 7.7-2 in comparative format.

Comment R-7: How do we ensure maximum protection from a technology? How can you assure us that it is safe? [*Documents 61-3, 61-5, 61-7*]
Response R-7: The ACWA EIS addresses the impacts to human health from operation of an ACWA pilot test facility to allow the risks of normal operations and accidents to be factored into agency decision making. The EIS and associated public meetings and outreach also provide the public with information on the safety of the facility and on potential impacts. In addition, additional engineering studies and systematization studies evaluate safety-related parameters to reduce risk to the public.

Comment R-8: Further health and safety analyses associated with the selection and implementation of technologies should be done. [*Document 25-12*]
Response R-8: As part of the engineering, design, and permitting processes, additional health and safety analyses will be done as required.

Comment R-9: Appendix C of the ACWA DEIS reflects a methodology that is conservative in all risk estimates and calculations. It is obvious that there are numerous assumptions factored into the impact of operations because of a lack of specific demonstration data or other empirical data. All additional data obtained by gathering additional demonstration information and/or conducting EDSs that can add to the information provided in this section should be incorporated into the ACWA FEIS. [*Documents 29-14, 108-16*]
Response R-9: The analyses are highly conservative, and the data are being refined through EDSs and will continue to be refined. However, for the purpose of ensuring that the potential impacts are adequately addressed, and in order to compare technology systems at a comparable level of development, the EIS will retain the more conservative estimates developed from the ACWA technology demonstrations. Corrections have been made when the estimates were found to be in error (e.g., dioxin estimates).

Comment R-10: If the Chemical Stockpile Disposal System adopts the D2Puff dispersion modeling system or any other advanced modeling system, it should be captured in the ACWA FEIS, with any deviations related to this section noted. [*Document 108-20*]
Response R-10: The D2Puff model has not been incorporated into the ACWA FEIS since it has not yet been adapted for all uses.

Comment R-11: We note and appreciate the inclusion of the recommended lower Lct_{50} standards by the National Research Council. [*Document 108-22*]
Response R-11: Comment is noted.

Comment R-12: There is no way everyone could be protected in the event of a spill. [*Document 111-3*]
Response R-12: Comment is noted. Spill response and contingency measures were considered in the analyses and models used in the EIS. The potentials for health effects and fatalities are addressed. These take into account spill response.

Comment R-13: With regard to p. 4-98 of the ACWA DEIS on the impacts of no action, what type of igloo agent monitoring is performed and what type of instrument will be used? The technology for each compound or compounds should be specified, and the accuracy of these field devices for detecting releases should be given. [*Documents 120-55, 120-56*]
Response R-13: The accuracy of the monitors and detection levels are considered in the EIS. The emergency response procedures for ANAD are described in greater detail in Section 4.7.1.4 of the EIS, which also summarizes the Chemical Stockpile Emergency Preparedness Program (CSEPP) for ANAD. This program is addressed in the CSEPP Chemical Accident/Incident Response and Assistance Plan.

Comment R-14: With regard to Table 6.6-3 on p. 6-68 of the ACWA DEIS, the modeled mustard gas concentrations are based on an emission rate equivalent to the minimum detection level of the exhaust gas monitor. Please include this information as a footnote to the table. [*Document 120-26*]
Response R-14: The following statement was added as a footnote to Tables 4.6-6, 5.6-4, 6.6-3, and 7.6-6: "The modeled agent gas concentrations are based on an emission rate equivalent to the minimum detection limit of the exhaust gas monitor."

Comment R-15: In the National Research Council (1999) report entitled *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons*, General Finding 11 states, "Although a comprehensive quantitative risk assessment (QRA), health risk assessment (HRA), and ecological risk assessment (similar to assessments performed for the baseline process) cannot be completed at this stage of process development, these assessments will have to be performed and refined as process development continues." Have any of these assessments been performed to address the full impact of these technologies? These statements imply that the technologies are not mature enough to even consider performing these critical assessments. Is this not true? [*Documents 25-12, 22-62, 56-25*]
Response R-15: Risk assessments may be required by state environmental regulatory agencies as part of the permitting process. This EIS contains similar analyses, but they are not at the level of detail that may be required during permitting. Quantitative risk assessments, health risk assessments, and ecological risk assessments may be required for any system, regardless of its maturity.

Comment R-16: I would like to address the impacts from using an incinerator at PCD, specifically those impacts to the environment and to livestock if there was an accidental emission of mustard gas. The economy of the surrounding communities of Boone and Avondale is primarily agricultural and ranching. The impacts would be devastating if there was an accidental emission. Boone and Avondale would be the first communities affected, and they are the ones that could least afford an economic impact of this nature, which could last weeks, months, or even a year. [*Document 12-1*]
Response R-16: Operation of either an incinerator or an ACWA alternative technology would involve a small risk of an accidental release of mustard agent at the PCD facility. The Army has conducted many studies of such hypothetical releases. Because of the physical characteristics of mustard (e.g., low volatility, generally subject to degradation upon contact with water) and the remoteness of the planned destruction facilities, modeling of most possible accident situations shows that no mustard would be released beyond the PCD boundaries. For some very highly unlikely catastrophic accidents (for example, a plane crash with an estimated frequency of occurrence of once every 10 million years or less), mustard agent could be released to off-site locations. The ACWA DEIS did look at both environmental and agricultural impacts from such a release (Section 6.21.2.9). Although the likelihood of such an accident is extremely small, the impacts would be very serious, as noted in the comment. The Army is very aware that the consequence of any off-site release (however unlikely) would be very serious and is attempting to further minimize the risk through extensive safety measures for handling and processing agent and through emergency preparedness programs. Chemical agent has been processed successfully without any off-site releases at the Army's Johnston Atoll and Toelle, Utah, sites.

Comment R-17: Several places in the document indicate that agent will be coming out of the stack or that there will be a release of "chemical agents or other chemical compounds as a result of occasional fluctuations in routine operations." At what levels is this release expected to happen? Why would fluctuating operations have any measurable potential exposure outside the processing building? Shouldn't the cascade air/carbon filtration and process ventilation controls be more than adequate to handle fluctuating operations? Are the health impacts of these agent releases being addressed? A footnote should be added to the table on p. S-60 to explain that the data on agent emissions assume total filter system failure, which is extremely unlikely.

What "other chemical compounds" are expected to be released? Tables 4.6-2, 4.6-3, 4.6-4, and 4.6-5 indicate that a variety of chemicals will be emitted. Mentioned are dioxins, furans, PCBs, chemical agent, and other types of chemicals. Again, what is the impact of those chemicals on people, including children? How much of those chemicals is coming out? What are you trying to do to prevent those chemicals from coming out? Would any medical costs to area residents increase?

Have the health impacts of emissions of chlorinated dioxins and furans been addressed? With regard to ACWA's Neut/Bio process, dioxins were apparently present in a test done in connection with a catalytic oxidation unit (CatOx). How did that happen? Are they, and how are they, effectively eliminated? Will a health risk assessment be conducted to determine the risk to the community from these plants? [*Documents 22-22, 22-25, 22-28, 22-34, 25-8, 25-9, 40-7, 56-2, 56-14, 56-15, 96-7*]

Response R-17: Potential chemical agent releases are discussed in Sections 4.6.3.3, 5.6.3.3, 6.6.3.3, and 7.6.3.3. With respect to agent releases, the planned processes include very efficient destruction techniques. In addition, facility stacks would have a system of several filter layers. The space between the layers would be monitored to detect even very small amounts of agent, and alarms would be sounded if agent was detected in the filter layers before it reached the final layer. Therefore, no release of agent is expected during routine operations. If agent was detected in the filter system, processing would cease immediately until the cause was determined. Unless a large amount of agent reached the filter system (very unlikely accident scenario), the system of filters and alarms would prevent any release outside the facility.

Although no agent is expected to be released from facility stacks under routine operations, in order to assess the worst possible adverse health impacts during routine operations, the EIS includes an assessment of the highest case of continued low-level agent releases that could be possible. This case would be the continuous release of agent at a concentration just below the detection limit. Even for this hypothetical worst-case emission, the maximum ambient concentration of agent would be only 0.34%, 0.03%, 0.2%, and 0.26% of the recommended limit for exposures to the general population at ANAD, PBA, PCD, and BGAD, respectively. Text has been added to Tables S.4-1, S.5-1, S.6-1, and S.7-1 to clarify that no agent emissions are expected, but that modeling of worst-case emissions resulted in ambient agent concentrations of less than 1% of the allowable concentrations for general population exposure.

Preliminary assessments of the potential health impacts from other chemicals that could be emitted from the facility stacks, including dioxins, furans, and PCBs, are presented in Sections 4.7.2, 5.7.2, 6.7.2, and 7.7.2. For storage sites where mustard would be processed (ANAD, PCD, and BGAD), the potential cancer risk from mustard emissions is also assessed (the nerve agents are not carcinogenic). Although emission data were not available for PCBs, they were included in the assessment by assuming a destruction efficiency of 99.9999% for each system that would process rockets. This assumption will be tested in forthcoming design studies.

The source of the low levels of dioxins detected during demonstration testing is not known. When thermal processes (e.g., CatOx), are used to process chlorine-containing mustard, the dioxins could be formed during the destruction processing. However, when nerve agents, which do not contain chlorine, are processed, it is more likely that the dioxins detected are artifacts from background levels found in process air. Although the assessment in the EIS tends to overestimate emissions so potential health risks from inhalation will not be underestimated, work is ongoing to find ways to further lower emissions in the final design of each technology.

The inhalation health risks for each site are summarized in hazard indexes and as carcinogenic risks in Tables 4.7-2, 5.7-2, 6.7-2, and 7.7-2. The risks are based on the estimated emissions given in Sections 4.6.2, 5.6.2, 6.6.2, and 7.7.2 and include dioxins and furans, when they were reported as being potentially emitted from a given technology. The methods used for estimating the risks are standard EPA methods that are summarized in Appendix C of the ACWA EIS. The assessment found that no adverse impacts on human health would be expected at any of the four storage sites evaluated. Therefore, there would be no increased medical costs to area residents.

Although information on the health impacts from the emissions of substances detected during demonstration testing is included in the EIS, the demonstration test data on which the assessment was based are somewhat preliminary. As stated in sections of the EIS on human health and safety during routine operations, demonstration test data were generally available for unit operations that would be expected to generate the most gaseous emissions during actual operations. Because of uncertainties in the data, the assessment was not as extensive as risk assessments for regulatory purposes are required to be. It should be considered a screening assessment (e.g., only the inhalation pathway, which tends to contribute the most risk, was assessed.) To compensate, the assessment tended to use predictive methods that would overestimate emissions and risks. During the permitting process for an actual ACWA facility, more complete emission and risk assessments would be required. The RCRA Part B permit requires that a complete multipathway risk assessment for facility emissions be conducted. Therefore, the emission levels and health risk estimates provided in the EIS should be considered indicative of likely levels, and they should be used primarily to identify significant differences, if any, among alternative processes.

Comment R-18: Are these systems capable of producing fluorinated dioxins and furans? How can you say that the emissions have been characterized enough to conclude that there will not be a health impact? [*Document 22-26*]

Response R-18: There have been some limited studies of fluorinated forms of dioxins and furans. In general, these compounds have been found to degrade much more quickly in biological systems than do chlorinated dioxins and furans. For example, one study found that "TFDD (tetrafluorodibenzodioxin, hypothetically the most potent fluorinated dioxin) is metabolically unstable, and thus currently does not fulfill the criteria for the recommendation of a TCDD or toxicity equivalency factor" (Schmitz et al., 1977, *Environ. Toxicol. Pharmacol.* 3(2):105–113). Another study had similar findings (Schrenk et al., 1994, *Organohalogen Compd.* 21 [Dioxin '94] 217–222).

Although fluorinated dioxins and furans have been synthesized in laboratories, there is no indication that they are produced by thermal treatment of fluorinated compounds or that, if produced, they would be environmentally persistent, as the chlorinated forms are. Therefore, these compounds were not included in the health risk assessment for the ACWA technologies.

Comment R-19: Section 6.7.2.2 covers risks of inhalation of chemical agent. It says that the estimates depend in part on detailed facility designs that are not yet available. When will they be? Before the final EIS? [*Document 96-46*]

Response R-19: The FEIS is based on the data in the DEIS, which are preliminary data from demonstration testing. As stated the "Human Health and Safety — Routine Operations" sections of the EIS, demonstration test data were generally available for unit operations that would be

expected to generate the most gaseous emissions during actual operations. Because of uncertainties in the data, the analysis was not as extensive as risk assessments for regulatory purposes are required to be, and it should be considered a screening assessment. (For example, only the inhalation pathway, which tends to contribute the most risk, was assessed.) To compensate, the assessment tended to use predictive methods that would overestimate emissions and risks. During the permitting process for an actual ACWA facility, a more complete emission and risk assessment would be required. The RCRA Part B permit requires that a complete multipathway risk assessment for facility emissions be conducted. Therefore, the emission levels and health risk estimates provided in the EIS should be considered indicative of likely levels, and they should be used primarily to identify significant differences, if any, among alternative processes.

Comment R-20: The ACWA DEIS provides equitable treatment for all alternatives when evaluating factors for the construction phase; however, for the operations phase, it is somewhat vague in its treatment of potential health and safety impacts and the mitigating measures envisioned for those impacts. For example, p. 4-95 in the section on other on-post workers states that as "technology designs near completion and as estimates of process efficiencies become more reliable," health risk assessments and emission estimates will be revised. Doesn't this statement indicate that none of the technologies have been proven to be able to destroy chemical agent in a plant environment or on any scale larger than a laboratory? Isn't it being inconsiderate of the community to try to test something in Anniston that has not been proven? The above statement says that the proposed technologies are not reliable yet. [*Documents 22-55, 25-1*]
Response R-20: The NEPA EIS process is used to identify possible adverse impacts on humans and the environment from a federal project and to compare alternatives that are under consideration when a federal agency makes a decision. An EIS is generally begun as early as practicable, when design and process data are still somewhat preliminary. Although the data are preliminary, the assessment is conservative (for example, the methods that are used overestimate rather than underestimate exposures and risks). After a specific course of action has been selected in the Record of Decision, the federal, state, and local permitting process is begun. Permitting requires more rigorous identification of actual emission levels and a more complete risk assessment for the specific technology being implemented. The four technologies considered in the EIS have undergone successful demonstration to prove that they are capable of agent destruction.

Comment R-21: Page S-79 of the ACWA DEIS on human health and safety and routine operations discusses the increased carcinogenicity risk to off-site populations from ACWA technologies and from ACWA technologies plus incineration. The discussion indicates that incineration provides most of the 62% of the risk level "generally considered negligible" (excess cancer rate of less than one in a million exposed individuals?). Although these numbers are below what would normally be a level of concern, it is difficult to see how routine incineration operations would contribute the level of risk implied here. The human health risk assessments for the baseline (incineration) facilities were quite low for cancer risk, even without the PAS (a carbon polishing filtration system) being installed. During routine operations at BGAD, we would not anticipate any discernable carcinogenicity risk to the general public from either ACWA or baseline operations. (See comment 8 below for general observation regarding carcinogenicity risk discussion.) [*Documents 25-10, 25-11*]

Response R-21: Table S.9-4 in the ACWA DEIS does not state that the incineration operation provided most of the 62% of the risk levels generally considered negligible; it states that "the maximum increase in carcinogenic risk to on- and off-post populations from simultaneous ACWA facility and baseline incinerator operations would be about 62% of the level generally considered negligible." Section 7.22.6.2 discusses the cumulative impacts on human health from an ACWA pilot test facility and a baseline incinerator. An EIS for BGAD is still in preparation; therefore, the estimates of human health risk from a BGAD incinerator were taken from Appendix H of the EIS for PBA (U.S. Army 1997). Appendix H summarizes the risk estimates for JACADS that were based on measured stack concentrations. These results were considered very conservative and were used as reasonable indicators for BGAD. Differentiating between risks of less than 10^{-6} may imply more precision in risk estimates than is warranted, and the text in the EIS does not imply that the carcinogenic risk from an incinerator would be significantly greater than the risk from an ACWA technology.

Comment R-22: The potential risk to human health is examined for the various ACWA technologies in several places in the ACWA DEIS (e.g., p. 7-89, C-16, C-17). Although it is clearly mentioned that levels below one in a million for increased cancer risk are generally considered negligible, actual calculated values well below this level are presented. These numbers could imply a false sense of precision for risk comparisons that is not justified or useful. For example, the maximum exposed individuals (MEIs) off post seem to have three to four times the cancer risk of the on-post MEIs from the various ACWA technologies (C-16, C-17). Similarly, mustard processing seems to be inherently safer than nerve agent processing from a carcinogenicity perspective. Perhaps it would be useful to caution the reader against trying to draw any risk comparison inferences when the carcinogenicity risk is found to be less than 1×10^{-6}. [*Document 25-13*]

Response R-22: It is agreed that comparing cancer risks that are less than 10^{-6} is not generally informative with regard to significant differences among the technologies. The following note has been added to Tables 4.7-2, 5.7-2, 6.7-2 and 7.7-2 and to Appendix C to clarify this point: "Risks from all technologies are less than 10^{-6}, in the negligible range. Although calculated risks range from approximately 10^{-11} to 10^{-7}, there is no significant difference in risk among the technologies; that is, for all the technologies, increased cancer risks from inhalation of emissions are in the range considered to be negligible."

Comment R-23: Throughout both the PCD DEIS and ACWA DEIS, the Army indicates that no significant impact will result from the construction or operation of a facility on the basis of the fact that the emissions from the proposed plant will not be above the limits established by the State of Colorado. However, this statement leaves a false impression that emission limits are indicative of health risk limits. This is not always the case. Adverse impacts can and do occur, even when emission levels fall within the established guidelines. [*Documents 26-3, 101-7*]

Response R-23: The ACWA EIS does assess adverse impacts independent of regulatory limits. For example, the well-established health risk assessment methods of the EPA are used to assess potential human health and ecological impacts from estimated facility emissions, even though the emission levels would be well below regulatory limits.

Comment R-24: Three technologies seem promising: (A) General Atomics, (B) Eco Logic and Foster Wheeler, and (C) AEA Technology. I am very glad to know that, according to the EIS, air pollutants would be within applicable standards. Also, routine operations would not produce adverse cumulative impacts on the health of the off-post public. [*Document 74-1*]
Response R-24: Comment is noted. However, the ACWA EIS does not identify technology systems by potential provider.

Comment R-25: Any way that one handles the destruction of these chemical weapons will be difficult and has hazards for the workers. And the possibility of a serious accident puts the outside community at some risk. Those weapons were made to kill people. Maybe we just have to face that getting rid of them may seriously injure or kill some of our own people. [*Document 74-4*]
Response R-25: Operation of an ACWA alternative technology would involve a small risk of an accidental release of chemical agent at each of the storage sites. The Army has conducted many studies of such hypothetical releases. Modeling of the most common industrial-type accident situations shows that no agent would be released beyond the site boundaries. Chemical agent has been processed successfully without any off-site releases at the Army's Johnston Atoll and Tooele, Utah, sites.

Comment R-26: In Section 2, Table 2.7-3, p. 2-27 of the ACWA DEIS, under "air quality — criteria pollutants" and "toxic air pollutants," there are claims of "negligible impact." This claim is not supported by data quoted in the DEIS or the TRD (Kimmell et al. 2001). [*Document 77-7*]
Response R-26: The table cited is a summary impact table. More complete discussions of the analyses that were conducted and the conclusions are found in the criteria pollutant sections (4.5, 5.5, 6.5, 7.5), toxic air pollutant sections (4.6, 5.6, 6.6, 7.6), and human health and safety sections (4.7, 5.7, 6.7, and 7.7). However, the analyses do support the findings of negligible impact for these areas. The criterion used to measure the significance of adverse impacts for criteria air pollutants is whether they exceed the National Ambient Air Quality Standards (NAAQS). When the modeling of emissions shows that the NAAQS are not exceeded (and, in fact, ambient levels would be well below the NAAQS), then the conclusion is that the impacts are negligible. Similarly, if toxic air pollutant emissions are lower than levels that would be regulated under EPA NESHAPS, then toxic emissions can be considered negligible. However, the ACWA EIS also assessed noncancer and cancer risks to on-site and off-site persons who might inhale the emissions (including emissions that are higher than usual due to fluctuating facility conditions). These risks were also found to be well below threshold levels that are generally considered indicative of serious risk. Therefore, the conclusion that the impacts on air quality from toxic air pollutant emissions would be negligible or low is justified.

Comment R-27: Number not used.
Response R-27: Number not used.

Comment R-28: Incinerator toxins have been found in pristine lakes with no other sources of pollution around for hundreds of miles. As a gentleman who spoke at the last meeting said, all of us already have radiation in our bones as a result of the nuclear tests conducted in the 1940s in the desert. Strontium 90 has been found in the baby teeth of children across the country. The wind blows as it will. Please, please don't add to this horrific military legacy by building these incinerators. We have closed-system alternatives; let's use them. [*Document 110-2*]
Response R-28: Comment is noted. However, it should also be noted that all of the destruction technologies will result in some air emissions, including the technologies being considered under the ACWA program. It is the specific types of substances emitted *and* their quantities that determine the exposure and risk. The ACWA EIS includes a preliminary assessment and comparison of the risks from emissions for the four alternative technologies being considered. The PCD EIS compares incineration technologies with ACWA technologies. If one of the ACWA technologies is selected, more detailed risk assessments would be conducted as a part of the permitting process.

Comment R-29: There is no time frame associated with Table 7.7-1 on annual hazard rates associated with the no action alternative versus the ACWA technologies. The no action option appears to extend into infinity, while any ACWA option would necessarily have an end point. [*Document 115-18*]
Response R-29: The time frame associated with the no action alternative is longer than that associated with the proposed action. However, the time frame associated with no action is not infinity, because both public law and international treaty require that weapons containing chemical agent be destroyed by 2007, with a possible extension to 2012. If none of the ACWA technologies for ACW destruction are implemented, the Army must proceed with the proven technology, namely incineration.

Comment R-30: The 1988 FPEIS for the Chemical Demilitarization Program using baseline incineration indicated a higher risk for continued storage (i.e., no action) than for disposal. The table referenced shows the opposite. Please explain this disparity. Please also provide an equal time frame for making comparisons within this table. [*Document 115-18*]
Response R-30: That analysis shows that risks from continued storage at BGAD exceed the risks associated with the operation of an ACWA pilot facility. Footnotes have been added to the hazard table to indicate the time required for ACWA construction and operation and the longest potential time frame for no action.

Comment R-31: In the ACWA DEIS, Section 7.7.2.2 on the impacts from operations and the referenced tables and Appendix C represent the best attempt at quantifying risks to workers and on-post and off-post residents on the basis of available information. Appendix C reflects a methodology that is conservative with regard to all dimensions of risk estimates and calculations. It is obvious, however, that numerous assumptions are factored into this section because of the lack of specific demonstration or other empirical data. All additional data obtained by gathering additional demonstration information and/or conducting EDSs that can add to the information provided within this section should be incorporated into the ACWA FEIS (or provided sooner, if possible, through ACWA Outreach) for public consideration. [*Documents 115-19, 119-17*]
Response R-31: After the ACWA FEIS is prepared, EDSs will be completed and incorporated in permitting the pilot facilities.

Comment R-32: Page 6-81, line 21 of the ACWA DEIS refers to risk calculations for the no action alternative shown in Table 6.7-3. However, this table was not in the DEIS. [*Document 120-31*]
Response R-32: The table reference in the text was incorrect. The reference has been changed to Table 6.7-1.

Comment R-33: With regard to p. H-11, the ACWA DEIS does not contain a full and complete analysis of the hazards that would be experienced by the workers at an ACWA pilot facility. Data on the health and safety impacts associated with activities not directly related to treatment (viz. plant operation) are given in total, but they should be disaggregated by accident category in the ACWA FEIS. Furthermore, some potentially significant impacts on workers involved with ACWs, including heat stress and emotional stress, are not addressed in the DEIS in any manner. We recommend that DOD address these impacts in the FEIS. [*Document 120-65*]
Response R-33: The type of health and safety analysis suggested in this comment is beyond the scope of this EIS and would be more applicable for a different type of assessment like a health and safety plan. Impacts such as heat stress could be included in the injury estimates provided for construction (Sections 4.7.2.1, 5.7.2.1, 6.7.2.1, and 7.7.2.1) and operation (Sections 4.7.2.2, 5.7.2.2, 6.7.2.2, and 7.7.2.2), provided they resulted in lost workdays.

Comment R-34: Are the risks associated with the handling and storage of process reagents, brines, etc. comparable? Is there enough known about the processes to compare these risks? That terribly hot water under terrific pressure in the General Atomics (A) process sounds scary. That is also a factor in the Eco Logic/Foster Wheeler (B) method. And the hydrogen gas used in it is very flammable and could cause a tremendous explosion. But the AEA (C) process deals with nitric acid, which is one of the effluents. What are the relative risks to workers from various failure scenarios for each of the alternatives? The issue of worker risk is lightly and generically touched upon. Are there no technology-specific risk scenarios worth considering (e.g., rupture of a high-pressure fitting)? The accident sections should also address internal accidents such as rupture of the SCWO unit operating at 705°F and 3400 psia during neutralization of energetics (see Volume 4, p. 13 of the TRD [Kimmell et al. 2001]: "Neutralization of energetics is not a mature technology.") What are the implications, if any, of the maturity of a technology for a demilitarization application on the industrial accident risk level? [*Documents 25-3, 74-3, 77-11*]
Response R-34: The risks associated with the handling and storage of process reagents for the four technologies are discussed in the document *Supplemental Report to Congress, September 1999* (for Neut/SCWO and Neut/Bio) (PMACWA 1999) and *June 2001* (for Neut/GPCR/TW-SCWO and Elchem Ox) (PMACWA 2001). In general, these assessments find that all the technologies are energy-dependent and not likely to cascade out of control. The process materials are all commonly used in industry and can be handled in accordance with well-established industrial safety practices.

For Neut/GPCR/TW-SCWO, preliminary designs called for transport of the required hydrogen gas to the site and on-site storage. However, the design was modified so that the hydrogen gas would be generated on site by steam methane reforming of natural gas, which would minimize the risk associated with the on-site storage of large quantities of hydrogen.

Because all the technologies use materials for which there are established industrial safety practices, a generic safety assessment using Bureau of Labor accident statistics was

deemed appropriate. The safety assessments are presented in Sections 4.7.2, 5.7.2, 6.7.2, and 7.7.2 of the ACWA EIS.

Comment R-35: Data on the consequences of emissions and the consequences to affected local communities are based on older information. Newer information is available through the EPA (both regional and national) as well as in the general literature, and those data need to be considered. I'm also concerned that the data on the impacts of dioxins (which may be of more concern with regard to incineration technologies than with regard to the ACWA technologies but nevertheless need to be addressed) may be drawing on limited aspects of EPA analysis and ignoring other aspects of that analysis.

Finally, the health impacts do not appear to adequately address either the newer literature on air pollution and health or site-specific public health concerns. For instance, in this area (PCD), chronic obstructive pulmonary disease and coronary artery disease are prevalent, and young vulnerable populations have fairly high incidences of allergies and asthma. What are the possible long-term health effects (e.g., lupus, asthma, birth defects, problems conceiving) from the ACWA technologies? Will these effects show up 5 to 30 years after operation? The Pueblo community already has higher rates of health effects than average because of air pollution. Incineration will contribute more to air pollution than will neutralization. [*Documents 36-4, 36-5, 36-6, 36-7, 41-9*]

Response R-35: We have used the most recent data that we know of. With respect to assessing the health impacts of dioxins, the EPA does not, at this time, have cancer or noncancer toxicity values available for chlorinated dioxins or furans through its peer-reviewed, preferred data source, the Integrated Risk Information System (IRIS, database available at http://www.epa.gov/ngispgm3/iris/index.html). Because no other more recent value was available for the ACWA assessment, the source of the cancer risk value used for the most potent form, 2,3,7,8-tetrachloro-dibenzo-p-dioxin (2,3,7,8-TCDD, or dioxin), was the 1997 EPA Health Effects Assessment Tables (HEAST). The source for the noncancer value was a "minimal risk value" developed by the Agency for Toxic Substances and Disease Registry. EPA guidance is available to aid in assessing the potency of the other forms of dioxins and furans in comparison with 2,3,7,8-TCDD. Entitled "The US EPA TEF Values," this guidance is available at http://www.epa.gov/ncea/dchem.htm. These toxicity equivalency factor (TEF) values were used in the risk assessment for inhalation of site emissions in order to include as many forms of dioxins and furans as possible. These methods for assessing the risks from dioxins and furans are the only methods currently available. See Appendix C for details and pertinent references.

The total calculated risks from all emitted substances (including dioxins and furans) were approximately 10^{-9} or less for all sites. (The higher values for ANAD Neut/GPCR/TW-SCWO in the DEIS were in error and have been corrected in the FEIS.) It has been pointed out that these risk values do not include possible uptake through food-chain pathways. Although this criticism is valid, note also that the total annual emissions of all forms of dioxins and furans for each technology are predicted to be very low. For example, annual emissions at ANAD could range from 0 lb (for Elchem Ox) to 0.000004 lb (for Neut/GPCR/TW-SCWO). For comparison, discharges, spills, or accidental releases of less than 1 lb of the most potent form, 2,3,7,8-TCDD, do not even need to be reported to the EPA.

With regard to the other health effects mentioned (e.g. chronic obstructive pulmonary disease, allergies, asthma, birth defects), although the toxicity database is not perfect, the toxicity values used to assess noncancer toxicity are intended to be protective against the adverse health

effect that would occur at the lowest exposure levels, and these values do include uncertainty factors to protect susceptible individuals. The environmental factors most associated with asthma are ozone and PM. Emissions and ambient levels of these substances are discussed in Sections 4.5, 5.5, 6.5, and 7.5 of the EIS. The NAAQS for these substances would not be exceeded as a result of emissions from any of the ACWA technologies.

See the response to Document 41-7 regarding potential long-term impacts and cumulative impacts of pilot testing an ACWA technology while an incinerator is operating.

Comment R-36: What are the long-term cumulative effects of what these processes (incineration and neutralization) are going to put out, even if they work the way they say they'll work? A serious accident is discussed, but what are the problems that will accrue years from now, even when the methods for destroying this very dangerous substance are properly functioning? [*Document 41-7*]

Response R-36: The best methods of health risk assessment currently available indicate that long-term cumulative effects are not expected from exposure to the emissions from any of the ACWA technologies. The assessment that was conducted intentionally overestimated inhalation exposures (e.g., by assuming that the hypothetical receptor would be exposed 24 hours per day at the location of the maximum concentration for the entire period of operation). The lifetime excess cancer risk based on that exposure was calculated. If an incinerator and an ACWA pilot technology were operating concurrently, the cancer risk was also estimated to remain less than 10^{-6}, which is the level generally considered negligible (see Sections 4.22, 5.22, 6.22, and 7.22 of the ACWA EIS).

Comment R-37: CWA-containing weapons are here and are not going away; we've got to deal with them; and there's a level of risk. One of the levels of risk is associated with storage, and another level is associated with moving the stockpile from wherever it is and putting it into whatever technology we select. Transporting the weapons is a relatively high-risk part of the process that will be present regardless of the technology chosen. [*Document 67-2*]

Response R-37: The impacts of accidents are summarized in Section S.8 of the ACWA EIS and discussed in detail in Sections 4.21, 5.21, 6.21, and 7.21 of the document. These sections do acknowledge that the greatest risks are associated with catastrophic external events that would cause the release of all of the agent contained in a single storage igloo (that is, the greatest risk is associated with continued storage). In the ACWA FEIS, these accidents are considered to be the crash of a large airplane into a storage igloo for the Pueblo site, and a lightning strike into a rocket-containing igloo for the other three sites.

Accident scenarios and probabilities from on-post transportation are discussed in an August 1987 report on the Chemical Stockpile Disposal Program entitled *Risk Analysis of the Continued Storage of Chemical Munitions*, SAPEO-CDE-IS-87009, by GA Technologies of San Diego, California. For the ACWA EIS, only the impacts from the highest-risk accidents were included in the accident assessment. The impacts from transporting agent from the storage igloos to a pilot testing facility were not included, because these risks would be the same for all alternatives assessed, and they had been looked at previously. However, it was found that rocket handling in the storage igloos would pose the highest-risk accidents for a pilot facility at ANAD and PBA. The accident assessments are described in detail in Sections 4.21, 5.21, 6.21, and 7.21 of the ACWA EIS.

Comment R-38: Risk assessments for both the PCD DEIS and ACWA DEIS evaluate only direct inhalation, and the PCD DEIS presents a qualitative risk assessment. For permitting purposes, a quantitative risk assessment for all potential exposure pathways needs to be done for the technology selected. The potential risks from the proposed ACWA technologies to human health and the environment need to be evaluated like the risks from incineration. The assumptions used for estimating risk need to be clearly stated in the EIS. For comparison purposes, the assumptions that apply to all of the alternatives should be identical. [*Documents 95-5, 120-27, 120-28*]

Response R-38 The risk assessments for the PCD DEIS and the ACWA DEIS are different because of differences in the technology development and permitting processes. The ACWA technology systems are in an early state of development and have yet to undergo RCRA permitting. Assumptions made in the ACWA EIS with regard to the four ACWA technologies are consistent.

Comment R-39: With regard to Table S.6-1 on human health and safety and routine operations, the statement that carcinogenic risks are "almost all associated with boilers, not destruction facility processes" appears unsupported, since only direct inhalation was considered for the risk estimates in the ACWA DEIS. For example, p. 6-75, line 22 should more clearly discuss that only direct inhalation was considered for risk estimates. It is also not clear what partitioning of risk would occur between process emissions (e.g., those from boilers) and emissions from treatment units if indirect exposure pathways were considered in the risk assessment. The majority of the persistent bioaccumulative compounds were assumed in the EIS to be emitted from the treatment units. EPA guidance on conducting risk assessments strongly recommends that indirect exposure pathways be considered, especially when persistent bioaccumulative compounds, such as dioxin, are assumed to be emitted (*Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities*, EPA, July 1998). It would also be helpful to know what guidance or procedures were used in conducting the inhalation risk calculations. [*Documents 120-14, 120-27, 120-28*]

Response R-39: After a specific course of action has been selected in the Record of Decision, the federal, state, and local permitting process will begin. During the permitting process for a specific ACWA facility, more complete emission and risk assessments will be required. For example, the RCRA Part B permit requires that a complete multipathway risk assessment for facility emissions be conducted. Therefore, the emission levels and health risk estimates provided in the ACWA EIS should only be considered indicative of likely levels and used primarily to identify significant differences, if any, among the alternative processes. The assumptions used in estimating risks from inhalation of routine emissions are stated in Appendix C of the ACWA EIS. The assumptions used were identical across the alternatives evaluated, but technology-specific emission estimates were used. The text in Table S.6-1 of the ACWA FEIS has been modified to state, "Carcinogenic risks *from inhalation* (almost all associated with boilers, not destruction facility processes) are 100 times lower than the 'benchmark' risk value."

Comment R-40: The risk assessment in Appendix C of the ACWA DEIS does not support the statement on p. 6-81, line 7, which states that "exposures through water, soil, or food chain pathways would result in minimal, if any, additional risk to off-post residents," since indirect exposure pathways were not evaluated. [*Document 120-30*]

Response R-40: One area considered beyond the scope of the ACWA assessment is the risk associated with indirect exposure pathways (specifically the food-chain pathways and pathways of potential importance with regard to substances that bioaccumulate). Of the emitted substances, PCBs, dioxins, and furans would be of most importance with regard to the food-chain pathways. Because the emission rates of these substances would be so low (less than 0.000005 lb per year for all forms of dioxins and furans and 0.005 lb per year for PCBs), it is unlikely that risks from food-chain pathways would be significant. However, if pilot testing of an ACWA technology is conducted in the future, a risk assessment, including an analysis of food-chain pathways, would also be conducted in order to meet permitting requirements. The text in Section 6.7.2.2 and Appendix C of the ACWA FEIS has been modified to acknowledge that the risks from indirect exposure pathways may be important, especially with regard to bioaccumulative substances.

S GEOLOGY AND SOILS

Comment S-1: Will the facility be designed to withstand earthquakes? A recent study estimates a much higher seismic hazard. [*Documents 96-54, 120-81*]
Response S-1: Required local, state, and federal permits would be obtained and honored for all construction required for an ACWA facility. Facilities would be designed for the applicable seismic zone. At the time of detailed design, the most recent information and guidance from relevant agencies would be used to ensure construction meets all applicable seismic requirements.

T SURFACE AND GROUNDWATER

Comment T-1: In this EIS, it seems as if many of the conclusions about PCD were based on outdated research, since no actual well water or air samples were taken for this draft. [*Document 105-2*]
Response T-1: The EIS was based on the best available data relevant to construction and operation of an ACWA pilot test facility at PCD. The effort included a review of a wide variety of literature, including water and air monitoring studies. These studies were judged to be adequate to assess the potential impacts of facility operation and construction. No new samples were taken specifically for the EIS.

Comment T-2: Because PCD has junior water rights, a situation could arise in which PCD would not be allowed to withdraw water from existing wells for chemical demilitarization purposes during drought years. [*Document 26-5*]
Response T-2: ACWA will consider water use and water availability over the lifetime of the pilot test in selecting a technology.

Comment T-3: The U.S. Army water rights are relatively junior rights, and additional water rights might be needed for an ACWA facility. [*Documents 45-1, 45-3, 96-31, 101-13*]
Response T-3: The existing document acknowledges the current water rights issues at PCD and that water from senior rights holders might need to be purchased.

Comment T-4: The water use and recycling issue concerns me with regard to all the ways there are for disposal and what materials will be released to the environment. [*Documents 90-1, 92-1, 102-3*]
Response T-4: Comment is noted. The EIS analysis used very conservative estimates of water use and disposal; that is, it used the highest estimated use of water and the largest estimated discharge of water. Even at these "worst-case" levels, no significant environmental impacts were found.

Comment T-5: Detailed text sections state that infrastructure demands would increase by some percentage, but there was no further characterization of the impacts that this increase would have. For example, streams receiving treated sewage effluent may already be at or near assimilative capacity. Hence, merely indicating that additional waste loading is a possibility does not portray its significance. [*Document 120-41*]
Response T-5: The capacity of the existing infrastructure and natural systems to receive additional wastewater was included in the analyses. The cumulative impacts section also took into account increases from reasonably foreseeable actions outside the proposed action.

Comment T-6: Withdrawals from the Terrace Alluvial aquifer at PCD could affect adjacent or surrounding aquifers (e.g., Chico and Boone Creeks) as well as local wetlands and streams. Additional details on many water issues, such as recharge time, are needed. [*Documents 12-2, 26-11, 45-3, 96-38, 120-33, 120-34*]
Response T-6: The Terrace Alluvial aquifer does not directly connect with either the Chico or Boone Creek aquifers. The Terrace Alluvial aquifer ends on the bluffs surrounding PCD in a

series of seeps and springs. Some water from these seeps and springs moves through the slopes to the lower, more productive, aquifers, but this amount is small. Given the time period of construction and operation and the amount of water withdrawn, it is unlikely that changes in the groundwater flow at the southern end of PCD (the outcropping of the aquifer) will be noticed. Water use by an ACWA facility would be significantly below historical PCD peak use, which occurred in 1983 and showed no measured impacts on the Chico or Boone Creek aquifers. The portion of the Terrace Alluvial aquifer that would be affected by ACWA water withdrawals does not have a significant effect on any of the streams surrounding PCD. There is some potential that wetlands slightly east and south of the proposed facility locations could be slightly affected, but this impact is unlikely.

The Terrace Alluvial aquifer is recharged by underflow from the north rather than by infiltration. Section 6.11 gives estimates for groundwater velocity and the distance from production wells to the termination of the Terrace Alluvial aquifer on the scarps south of PCD. Recharge time of the aquifer was not estimated because of the variability that depends on which wells are used for production.

Comment T-7: How would groundwater withdrawals at PCD affect surrounding water users, such as agricultural users who would be impacted by these groundwater withdrawals? How large would these impacts (e.g., socioeconomic impacts) be? Will there be reimbursement? The DEIS states these impacts are minimal, but the Rust, Inc. (1997) report states that a connection exists between the on-post Terrace Alluvial aquifer and surrounding aquifers; could this connection impact local residents? [*Documents 96-19, 96-37, 101-12, 101-13, 101-14, 105-3, 105-6, 106-3*]
Response T-7: Additional water would need to be purchased from current water rights holders in the water basin. This purchase would be made on a free market basis; thus, the water could come from any current water user in the water use area. This situation would also be true for drought conditions; water would need to be purchased from more senior water rights holders. The only water users that will be affected by groundwater withdrawals will be those who voluntarily sell or lease their water rights to the project.

The connection noted in the Rust, Inc. (1997) report is important in the context of that report, which addresses the transport of contaminants from historical contamination off post. This connection does not provide for significant amounts of flow between the two aquifers. The Terrace Alluvial aquifer beneath PCD is thin, usually less than 40 ft thick. Wells in this aquifer cannot pump amounts large enough to affect areas at great distances from the well because the wells would go dry. However, the region of the aquifer immediately downgradient (south) of the production wells could be affected; this portion of the aquifer terminates on the bluffs south of PCD in a series of seeps and springs. There will not be any regional lowering of the water table due to ACWA facility groundwater use. The region of the Terrace Alluvial aquifer that would be affected by ACWA facility groundwater withdrawals is completely intercepted by the existing boundary treatment system, where groundwater is treated before being released to the environment.

Comment T-8: The ACWA EIS states that the groundwater is good except for some high selenium levels. PMCD states that water has increased in hardness. [*Document 96-32*]
Response T-8: Comment is noted.

Comment T-9: The description of the groundwater regime at PCD seems to be generally acceptable, but the operation of a weapons destruction facility will affect the quality of the water supplied by the Youtsey Water Company. [*Documents 121-1, 121-2, 121-4*]
Response T-9: Comment is noted.

Comment T-10: The EIS does not describe in detail the most recent groundwater restoration activities underway at PCD. [*Document 96-61*]
Response T-10: The affected environment sections describe general features of the affected area and provide references to additional documents if more information is needed. Included are references to documents with significant details about ongoing restoration activities (e.g., Rust, Inc. [1997]). The cumulative impact section of the document, 6.22.10, describes interactions between various ongoing activities, where appropriate. Areas that will not be affected by ACWA activities are not described in detail.

Comment T-11: There is no discussion of floodplains in the BGAD sections. [*Document 94-1*].
Response T-11: Additional text has been added to address floodwater and floodplains.

Comment T-12: There is a possibility of accidental spills and air pollution. It is less than 100 ft from the surface through sandy soil to the aquifer atop the Pierre Shale, which could easily contaminate the aquifer. This is an environmental issue that I feel the Army should consider. However, the loss of a business with approximately 1,000 people who depend on water should be considered also. Some customers have inquired, "Is your water contaminated by Pueblo Chemical Depot?" The answer to that would be that now and in the past, the water has been analyzed by the U.S. Geological Survey, Colorado Department of Health, and other laboratories for contamination, and it is free of contamination at this time. I feel that this is true, since there is little activity in this area, but that would change if the proposed weapon disposal facilities would be located in this area of PCD. [*Document 121-5*]
Response T-12: The potential for regional groundwater contamination from accidents is addressed in the ACWA EIS. For accidents, this risk exists for both the no action alternative and the proposed action.

U TERRESTRIAL HABITATS AND VEGETATION

Comment U-1: Page 7-122 of the EIS indicates that impacts to trees and other vegetation from construction would be less in Proposed Area A at BGAD than in Proposed Area B. [*Document 115-21*]
Response U-1: Clearing for the sedimentation pond and contoured areas draining into the pond at Proposed Area A would probably affect essentially the same amount of forested acreage as the amount that would be affected in Proposed Area B.

Comment U-2: I do not agree with the discussion of wildlife impacts at Proposed Area A. [*Document 115-22*]
Response U-2: The FEIS has been revised to indicate what wildlife groups would be affected in Proposed Area A.

Comment U-3: Hunting takes place at BGAD, and precautions should be taken to prohibit consumption of any wildlife from BGAD after the startup of ACWA operations. [*Document 115-23*]
Response U-3: Comment is noted. The FEIS has been revised to determine whether potential emissions from normal operations would exceed any benchmark values for biota. These values are based, in part, on toxicity values and food chain accumulation and contamination.

Comment U-4: Will an ecological study be conducted at ACWA facilities to determine effects of small releases of chemical agents on wildlife? [*Document 22-1*]
Response U-4: There are no plans for such a study. However, the FEIS has been revised to determine whether potential emissions from normal operations would exceed any benchmark values for biota. These values are based, in part, on toxicity values and food chain accumulation and contamination.

Comment U-5: The ecological health of the PCD region, human health effects, and the regional economy as related to siting an ACWA pilot test facility or an incinerator are matters of concern. [*Document 69-2*]
Response U-5: These effects are assessed in the ACWA EIS.

Comment U-6: Why wasn't an ecological risk assessment conducted or planned for the Neut/Bio and Neut/SCWO technologies during normal operations at PCD? [*Document 95-21*]
Response U-6: The FEIS has been revised to include the results of an EPA-approved screening method of modeled soil concentrations to determine the ecological risk from deposition of chemicals during normal ACWA operations.

Comment U-7: A baseline level for potential contaminant concentrations in the tissues of flora and fauna should be presented for chemicals likely to be released during ACWA operations. Also, the ecological risk assessment being planned for the PCD restoration plan and the groundwater cleanup plan should be mentioned in the EIS. [*Document 96-55*]

Response U-7: Comment is noted. No such data exist for this EIS. The documents mentioned in the comment are in the process of being developed and are not yet available for review for incorporation in the EIS.

Comment U-8: Recognition should be given to the importance of the watershed along Boone Creek below Lynda Ann Reservoir for use by migratory and wintering waterfowl and as summer nesting habitat for ducks. [*Document 121-6*]
Response U-8: The text in Section 6.14.1.2 on birds has been revised to incorporate the commentor's observations on use by migratory waterfowl in the project area.

V AQUATIC HABITATS AND FISH; WETLANDS

Comment V-1: The DEIS does not discuss potential effects of water use on nearby aquatic habitats. [*Document 96-56*]
Response V-1: Water use by ACWA facilities is not expected to result in drawdown of surface water or aquatic habitats on PCD. All of the water used for operations is groundwater, and water demand for any of the ACWA technologies would have only a minimal impact on available supplies. The impacts of water use are presented in Section 6.11.3.

Comment V-2: Why are fish species in Boone and Chico Creeks at PCD and construction impacts along Haynes and Boone Creeks during construction and operation not addressed? [*Documents 26-27, 96-22, 101-18*]
Response V-2: Chico Creek is too far (more than 3 mi) west of any of the proposed areas for an ACWA facility to be affected by construction or operational activities. Stretches of Boone Creek able to support fish are more than 4 mi southeast of Proposed Area A and would not be affected by construction or operation of an ACWA facility. Both Haynes and Boone Creeks do not have aquatic habitats in areas that would be crossed by Corridor 4, an option for an electric power line in the northeastern portions of PCD.

Airborne emissions during operation would be so minimal that concentrations of pollutants deposited in water bodies downwind of the facility would not affect fish species. If mustard was released as the result of an accident, such as an aircraft crash and fire at a storage igloo or the Chemical Handling Building, amounts deposited in water bodies downwind would be minimal and would break down quickly by hydrolysis.

Section 6.15.2 of the FEIS has been revised to read: "Aquatic organisms, including fish, would not be affected by any factors related to construction or operation of an ACWA pilot test facility. Potential ecological risk from indirect effects of air emissions from an ACWA pilot test facility is presented in Section 6.15.3."

Comment V-3: The DEIS does not reference two documents recently completed for PCD and vicinity: the Integrated Natural Resources Management Plan and a survey of Chico Creek completed by the Colorado Natural Heritage Program. [*Document 96-60*]
Response V-3: A draft version of the Integrated Natural Resources Management Plan was reviewed in preparing the DEIS, but it could not be cited in the ACWA DEIS. At the time when this ACWA FEIS was prepared, the plan was still not in final form. However, information in this plan is a compilation of other final versions of site documents that could be cited in the DEIS. Including an additional reference on the Chico Creek survey would not contribute significantly to the description of the affected environment presented in Section 6.15 of the DEIS. Chico Creek is outside the area that would be affected by construction and operation impacts.

Comment V-4: The ACWA EIS states that emissions from normal operations will not affect wetlands but fails to indicate the location of such wetlands. [*Document 96-34b*]
Response V-4: Wetlands in the vicinities of the four installations are identified in Sections 4.17.1, 5.17.1, 6.17.1, and 7.17.1. In the FEIS, an additional analysis of the risk from air emissions to ecological resources is also presented.

W PROTECTED SPECIES

Comment W-1: There is no discussion of the impact from the possible use of groundwater on protected species and wetlands at PCD. [*Document 96-58*]
Response W-1: Groundwater use by any of the ACWA technologies would not affect wetlands or protected species. No drawdown of surface water or drainage of wetlands is expected from groundwater pumping. Water use impacts are discussed in Section 6.11.3.

Comment W-2: The list of protected and sensitive species at PCD presented in Table 6.16-1 should be revised. Revisions should include the addition of *Hybognathus hankinsoni* (brassy minnow) and *Vulpes velox* (swift fox), a candidate species. [*Document 96-57*]
Response W-2: The table was revised to add the brassy minnow as a state threatened species. The U.S. Fish and Wildlife Service (USFWS) removed the swift fox from the candidate species list on January 8, 2001 (*Federal Register,* Vol. 66, No. 3, pp. 1295–1300).

Comment W-3: The FEIS should show the final plans for electrical transmission lines. A recently described lizard species, triploid checkered whiptail lizard (*Cnemidophorus neotesselatus*), may be present at PCD, and the routing chosen for the transmission line should consider this species. [*Document 96-59*]
Response W-3: The route of any transmission line at PCD would not be determined until after the Record of Decision had determined that an ACWA pilot test facility would be located at PCD and after a facility location had been chosen. The request that the triploid checkered whiptail lizard be included in any transmission line surveys is noted.

Comment W-4: A discussion of the impacts of ACWA pilot testing on the Indiana bat should be included, since the bat is known to exist on BGAD. [*Document 115-26*]
Response W-4: There have been no observations of the Indiana bat on BGAD. Although the response from the USFWS (see Barclay 2000) indicates that this species is present at BGAD, a discussion with a USFWS employee indicated that the USFWS records show the Indiana bat as inhabiting Madison County, Kentucky, but do not include sitings from BGAD.

Comment W-5: The biological assessment at BGAD includes only two of the four technologies; it must include the four technologies. [*Document 115-25*]
Response W-5: The biological assessment at BGAD found in Appendix E is a copy of what was sent to the USFWS for comment. It is included in the EIS for reference. This biological assessment was prepared and submitted to the USFWS before the decision was made to consider the Elchem Ox and Neut/GPCR/TW-SCWO technology options in the EIS. The biological assessment was based on the loss of habitat from construction of an ACWA facility and associated infrastructure. The locations of proposed sites and the amount of land disturbed would be essentially the same for all four technologies. Operation of any of the four technologies would not result in emissions that would be harmful to the continued existence of endangered or threatened species. Consultation with respect to the *Endangered Species Act* is an ongoing process, separate from the NEPA process. If comments from the USFWS require revisions to the biological assessment, the status of the technology selection process will be reflected in the revisions.

Comment W-6: The EIS notes that Kentucky has no statute to protect endangered species. However, the federal *Endangered Species Act* exists for this purpose and should be referenced, along with the other State agencies. [*Document 115-24*]
Response W-6: This is acknowledged in Section 8 of the EIS.

X WETLANDS

Comment X-1: There is a potential for some springs on Boone Creek to be impacted. [*Document 121-3*]
Response X-1: Comment is noted.

Y CULTURAL RESOURCES

Comment Y-1: The Pueblo Depot Activity Development Authority also signed the agreement concerning historic structures. [*Document 26-25*]
Response Y-1: A statement has been added to Section 6.18.1.3 of the ACWA DEIS that the Pueblo Depot Activity Development Authority concurred with the Programmatic Agreement.

Comment Y-2: The cultural resources section should include references to applicable laws protecting Native American cultural, sacred, and historical sites. [*Document 115-27*]
Response Y-2: Section 9.7 on environmental permits and other compliance requirements discusses the requirements of the *National Historic Preservation Act* and *American Indian Religious Freedom Act*.

Comment Y-3: The EIS should clarify which federally recognized tribes have been consulted. [*Document 115-28]*
Response Y-3: Text has been added in the cultural resources sections for each installation to indicate that consultations have occurred, and the reader is referred to Appendix F for copies of the consultation letters and responses. These letters include a listing of all federally recognized tribes that have been notified.

Z SOCIOECONOMICS

Comment Z-1: The DEIS uses outdated material (e.g., pre-2000 Census results). The EIS should be updated. [*Documents 4-2, 26-4, 70-1*]
Response Z-1: The socioeconomics analysis and environmental justice analysis in the ACWA FEIS have been updated with 2000 Census data on population; however, not all socioeconomic data are available yet.

Comment Z-2: Page S-46 of the socioeconomics section states, "From 1990 to 1999, the population growth rate was less than 1%." Add "per year" after the 1%, or state that the population grew less than 1% between 1990 and 1999. [*Document 120-13*]
Response Z-2: The FEIS has been revised as suggested.

Comment Z-3: The EIS assumes a 12-hour day, six-day-per-week operation for the pilot facility. Will this be increased once the pilot phase ends? [*Document 35-2*]
Response Z-3: The analysis in the EIS assumes full operation of the facility for the duration of pilot testing (36 months). The ACWA EIS does not consider using an ACWA facility for stockpile destruction (see responses under D in this volume of the ACWA EIS); any operation beyond the end of pilot testing is outside the scope of this EIS.

Comment Z-4: The organization, command structures, work schedule of the work force and the workforce's understanding of processes are essential. There seems to be a sizeable work force for each of the technologies. Can you give me some feel for how complex the tasks are? [*Documents 9-2, 67-1*]
Response Z-4: To prepare the ACWA EIS, the work forces of JACADS, PBA, and Umatilla were examined to arrive at an estimate of work force requirements. To facilitate analysis, we took a broad look at the levels and skills needed for construction and operation. Work force compositions, working conditions, and worker training will be addressed further when detailed operational plans are developed after the detailed design and engineering of the technology or technologies selected for pilot testing are done.

Comment Z-5: The impacts of in-migration to the area during the construction and operation of an ACWA facility are described throughout the section. But nowhere is there consideration of possible negative effects from construction and operation. For example, there may be out-migration from the area or a decrease in agricultural practices. The EIS should account for such negative impacts, even if specific data or references are not available. [*Documents 108-18, 115-29, 119-18*]
Response Z-5: Although it is possible that there would be minor population out-migration as a result of stigma associated with the development of an ACWA facility, no data exist to illustrate such a trend. Issues related to perceptions of impacts that cannot be demonstrated or analyzed by reasonable scientific techniques are outside the scope of the EIS. See Response E-1.

Comment Z-6: Both the PCD and ACWA DEIS documents are very unclear concerning the employment of workers, in-migration numbers, and the use of transient workers. What an in-migration worker is and what a transient worker is should be clearly defined in both DEISs.

The more local people who are hired at a facility for both construction and operation, the less the in-migration and the fewer the impacts to the community. In addition, there is a greater chance that the dollars earned by these individuals will stay in the community. [*Documents 26-16, 96-29, 101-30*]

Response Z-6: The analysis of impacts of an ACWA facility on local population indicates that some workers will not be hired locally and will move into the area from elsewhere during construction and operation. These are identified as "in-migrant" whether they stay in the area permanently or move away after their job is completed. However, since it is not known whether there will be sufficient employment opportunities once ACWA facility operations cease, it is assumed that in-migrating workers only add to the population of the area during construction and operation activities.

Estimates of the number of in-migrant workers likely during construction and operation take into account the various occupations likely to be required, the number of workers in the local labor market currently in those occupations, and current local unemployment rates. Because of the highly specialized nature of the facility, reflected in the specialized functions required during both construction and operation, a certain proportion of managerial, engineering, and technical occupations are assumed to come from outside the local area, regardless of the local provision for these occupations. Appendix G provides more details on the estimation procedures used in the analysis.

Comment Z-7: In-migration should be divided between those who will bring their families to the community and stay for the duration of the project and transient workers who will be in the community for a short time and leave their families at a permanent residence, possibly in another state. Those individuals who will be in Pueblo for the duration of the project will have a greater impact, both positive and negative, on the community than will transient workers. Transient workers tend to live in mobile homes or apartments, buy very little besides food (not taxed in Colorado), and send the majority of their paychecks to their family members who live elsewhere. In addition, do the in-migration numbers include entire families or just workers? [*Document 26-17*]

Response Z-7: Since it is not known precisely how long any given group of workers in construction occupations will stay in the local area, the number of workers who will bring their families is difficult to estimate. In order to provide a worst-case estimate of the likely impacts of an ACWA facility, the analysis assumes that all in-migrating workers will bring their families, with one school-age child per in-migrant family. Impacts are estimated for the peak year of construction and the first year of operation. These would be the two years when the economic benefits of the project and any major adjustments in local public service provisions are likely to be the largest.

Comment Z-8: Why is the estimate of employment during construction of the neutralization technologies so much higher in the ACWA EIS than it is in the site-specific DEIS? [*Document 26-19*]

Response Z-8: Construction employment estimates for the two neutralization technologies in the ACWA EIS are based on labor expenditures for equipment fabrication and installation and for project management and engineering and on labor cost factors for activities undertaken in each of these categories. Appendix G provides more details on the estimation procedures used in the analysis.

Comment Z-9: I do not think socioeconomically there's going to be a huge (more than we have right now) influx of construction workers. Yes, there will be more, but I think they will come in staggered amounts. I don't see a need for additional big roads. I don't see the things that are being addressed by some of the people. [*Document 27-2*]
Response Z-9: The number of in-migrating construction and operations workers is addressed in Sections 4.19.5.1, 5.19.5.1, 6.19.5.1, and 7.19.5.1. More information on the method used to estimate in-migration into the region of influence can be found in Appendix G.

Comment Z-10: The State of Colorado has two laws in place that could impact the economic issues outlined in the socioeconomic section of the DEIS: the Taxpayers Bill of Rights (TABOR) and the Gallagher Amendment. TABOR is a constitutional amendment adopted in 1992 and places a limit on how much new revenue from all sources a taxing entity (city or county) may collect from year to year. Unless a vote of the people is taken, any dollars collected beyond the percent allowed must be returned to the taxpayers. This limits the amount that can be spent on infrastructure projects. The Gallagher Amendment places the burden of school finance on the business community and the property tax paid by businesses. However, the Army does not pay sales or property taxes, but presumably the contractors would pay both of these taxes. Regarding socioeconomic impacts, both DEISs are unclear on the payment of taxes. It should clearly be defined who will be paying both property and sales taxes. [*Documents 26-13, 96-27, 101-26*]
Response Z-10: In Colorado, sales of building materials for construction work on property owned by the U.S. government are exempt by statute from sales taxes if they become part of a structure, highway, road, street, or other public work owned and used by the U.S. government. Also, electricity and most fuels consumed in performing real property construction are exempt. The purchase or rental of equipment, supplies, and other materials by the contractor, however, is taxable.

The additional sales and use taxes collected by the State of Colorado during construction of an ACWA facility would not likely be greater than the revenue collected if the contractors performed construction for privately owned facilities. The impact of an ACWA facility on the TABOR rebate calculation would, therefore, likely be smaller than that of a non-government-owned facility.

The U.S. government does not pay Colorado income taxes. However, the additional income paid by the federal government to contractors during construction of an ACWA facility would affect the total income tax revenues collected by the State of Colorado and might affect the rebate calculation under TABOR.

Since the federal government is not subject to Colorado property taxes, additional construction on federal property would not change the ratio between residential and nonresidential assessed values; therefore, no adjustment to property tax rates would be required under the Gallagher Amendment. While the contractor would pay property taxes on real estate located elsewhere in the county, it is not likely that this facility would be additional real property. For example, if a local contractor is used, real property would already be owned, or if a contractor normally located outside the county is used, the real property would be rented. In either case, taxes on contractor-related real property would likely already be included in the local tax base.

Comment Z-11: The Institute for Defense Analysis recently visited the Pueblo area and informed elected officials that only about 10% of the overall project costs will be spent in Pueblo. If this is an accurate statement, the socioeconomic impacts in the DEIS documents do not reflect this number and leave the impression that a significantly higher amount will be spent in the area. These documents should be in agreement on the amount estimated. [*Documents 26-14, 101-27*]

Response Z-11: Estimates of the share of overall project spending flowing into the local economy take into account the industrial sectors in which project construction expenditures are likely to occur, the share of material expenditures in these sectors, and current unemployment rates in the local economy. By using this method, the analysis found that about 10% of construction material expenditures flowed into the local economy around the Pueblo site. With the exception of field expenses and expenditures on engineering services, for which some portion of project spending flows out of the local economy, all labor expenditures are assumed to take place locally. When expenditures associated with wage and salary spending are included, the local share of project spending increases. Appendix G provides more details on the estimation procedures used in the analysis.

Comment Z-12: In addition to trying to run a profitable farm and ranch, I'm a certified public accountant. When I decided to move back to Pueblo a few years ago, after having been gone for 20-plus years, I assumed that there would be professional jobs available in Pueblo and Pueblo County. I am surprised to find that there are relatively few when compared with the number in the rest of Colorado's Front Range communities. I have described Pueblo's economy as a barter system, with the U.S. currency as a medium of exchange. I buy from you and you buy from me, and we just keep exchanging money. This system works to sustain the economy, but it certainly does not provide growth opportunities. This was confused by a consultant hired by Pueblo recently, who states Pueblo's economy is based on recycled money. Basically, in his statement, recycled money is the same as the recycled scenario that I described as a barter system.

The numbers used to reflect indirect jobs as a result of direct employment appear to be inflated. A 7% multiplier factor is a very high factor to use. A factor of 3 to 4% would be more reasonable. If the number of people employed at the PCD consists mostly of local hires, the direct employment will be lower, since presumably, these individuals are already employed and thus creating indirect employment. [*Documents 26-18, 39-8, 96-30, 101-32*]

Response Z-12: The analysis in the EIS uses multipliers taken from an IMPLAN economic data set for Pueblo County, together with estimates of local spending flowing into individual local sectors and estimates of expenditures associated with wages and salaries, to estimate indirect impacts. The calculation of indirect effects does not depend on the size of the direct employment impact, only on the overall level of expenditures associated with spending in each sector and with wage and salary spending. Appendix G provides more details on the estimation procedures used in the analysis.

The analysis estimates the gross employment impacts of the project and does not take into account the extent to which ACWA-facility-related direct employment during construction and operation causes adjustments to be made in employment for other activities in other sectors of the economy on post or off post.

Comment Z-13: The documents fail to recognize the impacts of Davis/Bacon wages on the worker and the median income and also fail to look at the cumulative impacts of increased costs

of off-post construction. I don't think, either, that Davis Bacon wages are going to bankrupt the community. Many of the better contractors are already paying Davis Bacon wages. So let's not get carried away. [*Document 26-20, 27-4*]

Response Z-13: While estimates of project cost and the consequent local economic impacts assume Davis-Bacon wages are paid to construction workers, the short-lived nature of project construction is not likely to have a long-term effect on local wages or construction costs in the Pueblo area. Compared to the overall level of employment and income in the Pueblo area and the highly sector-specific and limited nature of material procurement, construction of an ACWA facility is not likely to draw a significant number of workers from other construction or industrial projects. Cumulative impacts of an ACWA facility on off-post construction costs are therefore likely to be minimal.

Comment Z-14: There are just too many schools and homes surrounding the proposed site in Madison County, Kentucky. [*Document 111-1*]

Response Z-14: Comment is noted. The locations of schools and populations at each of the sites are discussed in the EIS.

Comment Z-15: The EIS makes the statement that "existing housing stock would probably be able to accommodate increased demands." While this statement should be true, the effect of increased demands on poorer populations may be to make housing less affordable by applying upward price pressure on rents for existing housing stock. Increased prices on rents, goods, and services may have negative effects. [*Documents 96-26, 120-37*]

Response Z-15: The increase in housing demand would be relatively small in magnitude and last for only the short term, as discussed in Section 6.19.5.1. The magnitude of any resulting increase in housing costs should be similarly small and short term. Moreover, although a slight increase in demand might result in a slight increase in housing costs, increased employment associated with facility construction could well benefit poorer populations through direct and indirect hires and by driving salaries slightly higher because of a reduced labor supply. Given the small magnitude and short duration of anticipated impacts on housing and given the potential positive socioeconomic impacts on the low-income population in the vicinity of PCD, the EIS did not identify any high and adverse socioeconomic impacts or, hence, any socioeconomic impacts in the environmental justice discussion.

Comment Z-16: The discussion of housing issues outlined in the DEIS demonstrates a lack of understanding of current housing and rental costs in the community. Most of the housing available for purchase is in a high price range, and rental costs are as well, being almost equal to mortgage costs. There are about 900 families waiting for low-income housing in the community. The housing market in Pueblo will not respond to the short-term need for housing by merely building additional accommodations. The existing market will be called upon to absorb this need, and those individuals at the bottom of the economic scale will be squeezed out of the housing market. These individuals have the strong potential to become homeless, placing increased needs on social services. In addition, the Pueblo housing market is already absorbing some housing need from the Colorado Springs community, which has experienced a shortage of housing over the past few years.

Both DEISs do not properly address housing issues for the population as a whole or the influx of workers during construction. They do not address socioeconomic or housing impacts on

the seasonal and migrant worker population of the area. There is currently a severe lack of migrant and low-income housing available. These impacts are not addressed in the reports. [*Documents 26-15, 96-26, 101-24, 101-25, 120-37*]

Response Z-16: It is likely that a fairly significant proportion of the available owner-occupied housing would be used by ACWA facility employees once operations began. However, it is also likely that these workers would occupy housing in the mid to high price range, given the income levels associated with the various occupational groups that would be needed. The consequent impact on lower-income housing during operations would therefore probably be minimal. During construction, the impact on the low-income housing market could be larger, since the influx of workers from outside the county would be staying on a temporary basis and therefore be more likely to rent cheaper accommodations that might otherwise be available to low-income families. However, since only about 30% of all vacant rental housing would be likely to be occupied by construction workers in the peak year, and since it is assumed that these workers would leave the area once construction was finished, the impact on the low-income housing market would be fairly small. Moreover, since it is likely that some proportion of low-income families would be eligible for public housing not available to migrant construction workers, the extent of competition between the two groups, and the consequent additional burden on local social services, might be limited.

Comment Z-17: The assumption is made that an accident would not create additional impacts on housing values, since the housing values in the area already reflect the presence of the chemical material of the depot. This is not a good assumption to make unless it can be backed up by information from the housing market in the area. It is more logical to assume that although the housing market reflects current market conditions, including the presence of agent at the depot, any accident that would impact off-post land would further lower the area's housing market because of the perception that the land is contaminated. This stigma could last for many years. [*Document 26-28*]

Response Z-17: It is likely that public perception of chemical storage activities, and any stigma that may have developed, is already reflected in the local housing market. This effect on the housing market takes into account not only the presence of agent material at the depot but also the potential for accidental release of chemical agent. The impact of an accident involving chemical agent at the depot on housing values would therefore probably be minimal, and if residents were prevented from quickly returning to their homes, it would be only temporary.

Comment Z-18: What I might see, and this is a problem that's national and I don't think the government can solve, is that we have a shortage of qualified teachers. So I would discourage any worker who's in a good school system from coming here. Our quality of education is going downhill. [*Document 27-3*]

Response Z-18: The number of new teachers that would be required during construction and operation is addressed in Sections 4.19.5.1, 5.19.5.1, 6.19.5.1, and 7.19.5.1. More information on the method used to estimate the number of teachers required in the region of influence can be found in Appendix G.

Comment Z-19: On p. 6-149, Table 6.19-8 (public service employees in Pueblo, Pueblo County, and Colorado) indicates that the number of paid fire protection employees in Pueblo County (not including the City of Pueblo) is zero. The correct number is 50, including 29 with the Pueblo

Rural Fire Department, 12 with the Transportation Technology Fire Department, 4 with the Rye Fire Protection District, 3 with the Pueblo West Fire Department, and 2 with the Department of Emergency Management (Pueblo Emergency Response Teams). It is unclear why volunteers were not included in the count. It is typical for rural areas, including Pueblo County, to rely on volunteers for fire protection. [*Document 114-1*]

Response Z-19: Data provided by the commentator have been used to revise the FEIS. Volunteers are not included in estimating the impacts of an ACWA facility on the provision of local fire services because it cannot be assumed that there will be enough additional volunteers to respond to an increased demand for the services of any particular fire department. While some fire departments, especially those in rural areas, rely on volunteers, it is assumed that departments will be able to maintain existing levels of service only by hiring more paid firemen.

Comment Z-20: Medical costs are increasing for area residents, many of whom are the working poor who neither qualify for Medicaid nor can afford medical insurance. For those with medical insurance, coverage is decreasing and costs are rising. Any pollutants added to the air may aggravate existing respiratory problems, of which Pueblans have 150% of the level of the rest of the state. Sulfur dioxide levels are already high and may get higher after recently permitted facilities are built. Cancer-associated risks from dioxins and other pollutants can add to medical costs. Air pollution is a problem in Pueblo, owing to lax enforcement of the *Clean Air Act* by the state and egregious violations by the resident steel mill. Three coal-burning plants have been permitted for the area (power, cement). Increased expenses will be borne not by insurance but directly by the people. [*Documents 40-8, 96-63, 107-1*]

Response Z-20 Locating an ACWA technology at PCD is not likely to affect group insurance rates for the population of the area. The presence of chemical weapons stored at the depot and of other hazardous facilities in the area is already reflected in insurance rates. All current activities at the depot are properly permitted by the appropriate agencies, and any ACWA pilot facility that would be located in the depot would also have the necessary permits to allow it to operate within the relevant emission standards. It is highly unlikely, therefore, that any additional facility at PCD would affect the group insurance rates.

Comment Z-21 The information included in the DEIS documents provides minimal information concerning the traffic that will travel in and out of the depot on a daily basis. We are concerned that the infrastructure in the area is insufficient to handle the peak loads for both truck and passenger traffic. [*Document 72-4*]

Response Z-21 Estimated traffic impacts during construction and operation are based on average annual daily traffic counts and levels of service, which take into account the physical characteristics of specific segments and current traffic levels on all the roads used by site worker and contractor vehicles. The number of daily trips on and off the site can be fairly accurately estimated on the basis of the timing of existing flows and estimates of trips during construction and operation. However, the impact on the road system surrounding the site during peak hours is more difficult to forecast in the absence of peak-hour data and projections. Changes in levels of service with the addition of ACWA-facility-related construction and operation traffic provides a general indication as to the likely impact of these activities.

Comment Z-22: Both DEISs do not indicate what socioeconomic impacts there would be, particularly on agriculture, as a result of higher water prices. Both reports indicate the impacts

would be negligible, but there are no data to support this statement. Also, there are no data to indicate how the impacts were assessed and if they included extreme situations, such as several years of drought. [*Documents 96-18, 101-8, 101-9*]

Response Z-22: If an ACWA facility were to be located at PCD, additional water would need to be purchased from more senior water rights holders on the open market. This situation would also occur during drought conditions, when water would need to be purchased from water rights holders. As these adjustments in water supply would occur in the open marketplace, there would be a potential for higher prices. However, given the relatively small amount of water that would be used by the facility (since all process water would be decontaminated and reused within the pilot facility) and the short duration of construction and pilot testing, there is little potential for an effect on water prices. Only owners who voluntarily sell or lease their water rights to DOD would be affected.

AA ENVIRONMENTAL JUSTICE

Comment AA-1: At BGAD, the majority of citizens affected during the "Smoke Pot Incident" of 1979 were people of color, lending evidence that chronic emissions from a baseline incinerator and/or releases of agent during routine and nonroutine operations have the potential to disproportionately impact such minority populations. In addition, the figures provided show the proportion of low-income population within 30 mi of BGAD to be well above the national average, so this group addressed in Executive Order 12898 also would be affected. [*Document 115-56*]
Response AA-1: The term "Smoke Pot Incident" refers to alleged respiratory health effects from smoke pots being burned at BGAD in 1979. The emissions from such an incident bear no relationship to the emissions from an ACWA pilot test facility. The analysis of human health impacts from normal operations does not indicate that any high and adverse impacts that are necessary to trigger environmental justice considerations are likely, as discussed in Section 7.7. In contrast, the impacts from accidents under both the proposed action and no action alternative, although they would be highly unlikely, would have serious negative implications for environmental justice populations, as discussed in Section 7.21.2.10.

Comment AA-2: We concur that the construction and operation of an ACWA technology may not disproportionately affect people of color or low-income communities in Alabama. However, beyond the literal interpretations of the Executive Order on Environmental Justice, the intent of the executive order should be upheld: that everyone has the right to a clean, healthy environment and the highest levels of protection of human health. This may be beyond the narrow scope of the EIS, but we urge ACWA to develop an understanding of environmental justice principles on which the Executive Order is based. [*Documents 108-19, 115-30, 119-19*]
Response AA-2: The ACWA program is committed to providing a clean, healthy environment for all people and to protecting human health. Environmental justice principles have been incorporated into the ACWA technology development program, the NEPA process, and the regulatory process.

Comment AA-3: There are many minorities in the area of PCD. Why is the government constantly dumping in this area? [*Documents 52-2, 52-3*]
Response AA-3: The ACWA pilot test facility would test an alternative technology for eliminating assembled chemical weapons from the PCD area. ACWA pilot testing would not require the creation of any more waste disposal facilities in the area of PCD. The analysis of cumulative impacts to minority populations does not identify any high and adverse impacts of the sort that would cause noticeable effects either to human health or to socioeconomic conditions.

Comment AA-4: The potential for disproportionate impacts on populations who are vulnerable to an increased burden from health impacts raises issues of environmental justice that need to be more completely addressed in the final EIS. [*Document 36-7*]
Response AA-4: The health impacts analysis concludes that health impacts, while higher for sensitive populations, are still expected to be low. Children are considered to be representative of sensitive populations (Sections 4.7.2.2, 5.7.2.2, 6.7.2.2, 7.7.2.2).

Comment AA-5: Why did the ACWA DEIS use national census figures and the site-specific EIS use Colorado census figures for the environmental justice analysis? [*Documents 26-21, 96-25, 101-22*]
Response AA-5: The ACWA DEIS used national percentages as reference numbers to define disproportionality because it is a document that considers four different localities in very different parts of the United States. The EIS entitled *Destruction of Chemical Munitions at Pueblo Chemical Depot, Colorado* focuses solely on Pueblo Chemical Depot; thus, a case can be made for it to use a more site-specific indicator for disproportionality. In either case, there would be no high and adverse impacts regardless of the means of defining disproportionality.

Comment AA-6: Don't the guidelines for environmental justice issues require an 11-county area to be used rather than just Pueblo County? [*Document 26-21*]
Response AA-6: Environmental justice guidelines contain no geographic guidance of a sort that makes reference to a particular number of counties. For the ACWA DEIS, a dual focus was employed: one considered Pueblo County in order to be consistent with the socioeconomic analysis, the other considered smaller geographic units within 30 mi (50 km) of the proposed facility. The ACWA DEIS used census tracts for the smaller geographic units; in the FEIS, this practice was revised to use census block groups in order to be consistent with the analysis of human health impacts at PCD (as noted in Section 6.20).

Comment AA-7: The ACWA DEIS indicates there are 62 census tracts within a 50-km radius. The PMCD breaks these tracks down to those completely within the 50-km radius area and those partially within the radius. Why the difference? It is confusing. [*Documents 96-25, 101-23*]
Response AA-7: Although the ACWA DEIS considered census tracts in its examination of environmental justice issues, this practice has been revised in the FEIS to examine census block groups (smaller geographic units than tracts), in order to maintain consistency with the analysis of human health impacts (see Section 6.7). The FEIS updates the analysis to include recently released data on minorities from the 2000 census. Again, the examination of environmental justice treats all census block groups with disproportionately high minority or low-income populations the same, regardless of whether they are completely within a 30-mi (50-km) radius of this area or only partially within this area. Aggregating the latter group with the former group is a more conservative approach, possibly including people who, in fact, live slightly beyond 30 mi (50 km) from the site, and it is ultimately simpler. Note that in the absence of high and adverse impacts, environmental justice impacts are not present, regardless of the means of defining the geographic region of focus.

Comment AA-8: The DEIS used the 1990 census information to determine the minority population in the immediate vicinity of PCD, yet it acknowledges that the 1990 census does not account for the migrant/seasonal population of the area. There are other data available that should be used to help determine the percentage of this population; otherwise, the report is incomplete. [*Documents 96-25, 101-21, 120-35*]
Response AA-8: In the EIS, migrant and seasonal workers were included solely in qualitative terms. The ACWA EIS has been updated to include 2000 census data; however, complete data are not available yet, nor are estimates of migrant/seasonal populations. Section 6.20.1 already identifies Pueblo County as containing greater percentages of minority and low-income populations than the nation as a whole. Finally, in the absence of high and adverse impacts,

environmental justice impacts are not present, regardless of the inclusion of seasonal or migrant workers. Inclusion of migrant worker populations would not change the designation of Pueblo County as containing a disproportionally high percentage of minority or low-income persons. We recognize that inclusion of additional data would not change the results of the analysis; therefore, the report is not incomplete.

BB ACCIDENTS INVOLVING AGENT

Comment BB-1: ACWA uses the same worst-case scenario (airplane crash) instead of a more likely or realistic scenario (i.e., tornado, lightning strike). [*Document 96-48*]
Response BB-1: The accident risk scenarios have been revised to include natural factors (tornado, lightning strike) at ANAD, PBA, and BGAD. The airplane crash scenario has been retained at PCD.

Comment BB-2: It seems that all the proposed site locations violate Army quantity distance safety regulations for a facility that deals with explosive materials. Please discuss the justification of the proposed sites relative to these safety concerns. [*Document 22-31*]
Response BB-2: The ACWA DEIS identifies several broad areas at each installation as potential facility locations on the basis of previous Army documentation, which included the distance to ACW storage locations as a siting criterion. Depending on the exact location within the areas identified, some locations could be closer to an existing facility than is allowed by current Army procedures. Depending on the installations and ACWA technology systems selected for pilot testing, more detailed siting analyses would be performed to determine exact site locations. These studies would take into account engineering, environmental, and safety considerations, including Army regulations.

Comment BB-3: Section 6.21.1.3 on p. 6-166 of the ACWA DEIS states, "For all the hypothetical accidents assessed, the no effects plume contour extends into off-post areas (i.e., extending to 30 mi [50 km]). The extent of the no deaths contour varies from 1 to 12 mi [1.6 to 19.3 km], depending on the meteorological conditions assumed." This section fails to mention that the distance to Pueblo is 14 mi. In the event of this rare accident scenario, the entire population of Pueblo would be at potential risk for health effects from mustard exposure, with the city portions that were actually affected depending on the wind direction. [*Document 95-10*]
Response BB-3: The fact that a portion of the city of Pueblo could be located within the plume contour of such a release has been clarified by adding the population potentially at risk (i.e., residing within a 50-km radius of each site) to Sections 4.21.2.4, 5.21.2.4, 6.21.2.4, and 7.21.2.4. The addition of this information was recommended in Document 95-11 (see below).

Comment BB-4: In Section 6.21.2.4 on p. 6-170 of the ACWA DEIS, lines 12 through 14 state, "This evaluation did not specifically estimate the numbers of nonfatal injuries that would occur for each accident scenario, because there would be great variation in the number and severity of nonfatal injuries, depending on exposure." While it is not possible to predict the number of injuries, it is possible to calculate the distance downwind to a "no deaths" contour. For several of the scenarios, this distance is given as more than 31 mi (Table 6.21-1). Thus, Table 6.21-2 should include an extra column listing the total population living within 31 mi of PCD, since these people are all potentially at risk of injury, depending on the wind direction at the time of the accident. This population at potential risk would include the entire city of Pueblo.

The PCD DEIS does this calculation and discusses the possibility of 5,900 deaths if a very improbable accident were to occur. It mentions a number of other areas, such as the community of Rocky Ford, that are within a 31-mi radius of PCD. Page 4-151 of the PCD DEIS lists areas of six other counties that could be affected by a large accidental release. These other

potentially affected areas are not mentioned in the ACWA DEIS. The accident presentation in the ACWA DEIS should be revised to be consistent with that in the PCD DEIS. [*Document 95-11*]

Response BB-4: The addition of information on the size of the population potentially at risk from accidental agent releases would be useful in Sections 4.21.2.4, 5.21.2.4, 6.21.2.4, and 7.21.2.4 of the ACWA FEIS, so it was added.

The ACWA DEIS also listed areas of six counties that could be affected by a large accidental release (see Section 6.20). After the PCD and ACWA DEISs were prepared, the results of the accident assessments were coordinated and revised. Although the accident assessments in the final versions are not identical because of differences in the types of facilities being assessed, they are now much more similar than they were in the draft versions of the EISs.

Comment BB-5: Section 6.21.2.4 of the ACWA DEIS on human health and safety discusses the closest off-post residence. These residents have been supplied with suits, gloves, and respirators to be used in the event of a mustard gas release. The ACWA DEIS states that these precautions should prevent any injuries or deaths at this location. For the nighttime plane crash scenario hypothesized, these residents may not be able to take action quickly enough to prevent death or injury. [*Document 95-12*]

Response BB-5: The text in the section has been modified as suggested to indicate that the residents may not be able to take action quickly enough to prevent death or injury.

Comment BB-6: Page 6-173, line 5, and p. 6-189, line 9 of the ACWA DEIS indicate that structures, offices, shops, etc. on the TTC site are about 3 mi from the PCD site boundary. That distance is actually 5 mi. [*Document 114-2*]

Response BB-6: The text has been changed to reflect the above distance.

Comment BB-7: Page 6-189, lines 4 and 5 of the ACWA DEIS indicate that "portions of the residence have been overpressured to allow safe shelter-in-place if necessary." That is incorrect. No portion of the referenced residence has been overpressurized. The occupants of that residence have been issued personal protective equipment (PPE) to support shelter-in-place. They have also been given training on the use of that equipment. [*Document 114-3*]

Response BB-7: The text has been changed to reflect the above information.

Comment BB-8: It seems that one of the dangerous points at PCD is transferring agent from the igloos to the facility. How would that be accomplished? [*Document 50-6*]

Response BB-8: Agent from the CLA would be transferred to the destruction facility by using vehicles equipped with sealed 20,000-lb on-site containers (ONCs). ONCs are designed to protect munitions from any accident during transport. The risks associated with such transfers have been thoroughly examined by the Army under its programmatic EIS (U.S. Army 1988) and more recently under the quantitative risk assessments (SAIC 1996, 1997a,b,c), which are continuing under the Army's Chemical Stockpile Disposal Program.

Comment BB-9: Regarding methods of analysis and the D2PC model assessment, if PCD adopts the D2Puff dispersion modeling system (or any other advanced modeling system), it should be discussed in the ACWA FEIS, with any deviations from other models noted as related to this section. [*Documents 108-20, 108-21, 115-32, 115-34, 119-20*]

Response BB-9: The Army's goal is to fully accredit the use of the D2Puff model, which is an ongoing process. The model has been approved for use at five of the eight CSEPP sites for training, exercises, and planning purposes, but not for response situations. Most of the hazard analysts at each of the Army chemical depots have been trained to use the new model. This model has been installed at Umatilla, Deseret, Blue Grass, Pine Bluff, and Anniston.

At this time, however, the only fully accredited model for use at all of the CSEPP sites is the D2PC model, also known as D2. This model is approved for use in both real and actual emergency situations. Although the Army's goal is to replace the D2 model with D2Puff, D2 will continue to be used in support of CSEPP for the foreseeable future, as directed by the Department of the Army's Safety Office. Given this status, the accident consequence assessments reported in this EIS continue to be based on estimates from the D2PC model.

Comment BB-10: The public has been tasked with reviewing and commenting concurrently on two DEISs (ACWA and PCD) that relate to the destruction of the PCD chemical weapons stockpile. This office has reviewed the accident scenarios associated with the no action alternative (continued storage) included in both documents and is struck by the marked differences between the consequences associated with those accidents. Although the scenarios in both DEISs are very similar and the same dispersion model (D2PC) is used, the outcomes are sufficiently different to bear mention. Concerns about the use of D2PC in the two DEISs prompted this office to seek clarification from the Army. We received that clarification in the form of a May 11, 2001, information paper furnished by the Office of the Chief of Legislative Liaison, U.S. Army, which notes, "Each agency relies on past practice in the development of assumptions to run their models. Although PMCD and ACWA used the same agent dispersion model (D2PC), the different assumptions caused different outcomes." How different are those outcomes? According to the ACWA DEIS (Table 6.21-2), the estimated fatalities associated with an aircraft crash into the storage area under very stable (E-1) weather conditions would total 75 (59 on post and 16 off post). In contrast, Table I-7 in the PCD DEIS indicates that a similar accident, under similar conditions, could potentially result in 5,900 to 12,200 fatalities, depending on the sensitivity level of the population at risk. Although the two model outcomes are strikingly different and the larger numbers are extremely unsettling, it is important to note that neither projection is linked to the agent destruction technology. They are both storage-based scenarios and are therefore technology neutral. [*Document 114-4*]

Response BB-10: The ACWA and PCD DEISs essentially assess the same storage-based accident scenarios but report markedly different results. These differences are most notable with regard to the estimated fatalities associated with the worst-case or bounding accident for the no action (continued storage) alternative. Furthermore, the same or a similar disparity in results exists for the reported impacts under the proposed action as it pertains to the storage of agent in the CLA during agent destruction. These differences in results are due to the differing assumptions used in the accident modeling analysis. A few of these assumptions, which are used in only one of the DEISs, are primarily responsible for producing the large disparity in the estimated fatalities.

The program managers for each EIS have reviewed the assumptions and reached a consensus on modeling parameters that would reflect a more realistic scenario yet provide a very conservative bounding assessment. The Army's review consisted of discussions and technical exchanges between the two groups responsible for conducting the accident analysis. Many of the assumptions were based on or derived from practices used in conducting the accident modeling

reported in past programmatic (U.S. Army 1988) and site-specific EISs (e.g., U.S. Army 1997) in support of CSEPP. These and other assumptions have been thoroughly reviewed and updated as appropriate to represent the best practice and consensus of the experts involved in performing the analysis. The end result is a set of assumptions that is more consistent between the PCD DEIS and ACWA DEIS. Regardless of the assessment assumption or the technique used, these projections are bounding estimates that assume the occurrence of an extremely unlikely catastrophic event. Any potential chemical impacts resulting from a more credible accident at PCD are likely to have much less severe effects than those estimated in either DEIS.

Comment BB-11: On p. 4-208 of the ACWA DEIS, the statement that GB is expected to degrade in air quickly due to acid/base hydrolysis appears to be contrary to the analysis provided in Appendix A on p. A-15. The estimated half-life of GB is projected at 7.7 hours. Hydrofluoric acid is a hydrolysis product. It is very corrosive and toxic. No direct information on this compound is provided on p. A-15. [*Document 120-58*]
Response BB-11: Although data on the fate of GB in the atmosphere are lacking, GB is probably subject to photolysis and radical oxidation, as well as hydrolysis upon contact with water vapor in air. In general, any hydrogen fluoride formed in this reaction would be dilute and not at a high enough concentration to have adverse health effects. Hydrogen fluoride is removed from air by condensation or nucleation processes. However, the text in Section 4.21.2.3 has been modified to clarify that data on the atmospheric fate of GB are lacking.

The text in Section 4.21.2.3 has been modified to state the following: "GB is considered nonpersistent because it is volatile, soluble in water, and subject to acid-base hydrolysis. Although data on the fate of GB in the atmosphere are lacking, it is likely to be subject to photolysis, radical oxidation, or hydrolysis upon contact with water vapor (Munro et al. 1999). Therefore, it is unlikely to persist in air."

Comment BB-12: With regard to Section 4.21.1.3 of the ACWA DEIS on exposures and deposition and the text on the "no effects" plume on pages 4-203 and 4-204, the revised Acute Exposure Guidance Levels (EGLs) for GB and VX currently under review by the EPA (*Federal Register*, Volume 66, No. 85) should be factored into this section upon their promulgation. Proposed EGLs for mustard currently under consideration by the EPA (CAS Reg. No. 505-60-2) should also be factored into this section upon promulgation. [*Documents 108-21, 115-33, 119-21, 119-22*]
Response BB-12: The EPA's proposal of AEGLs for mustard and nerve agent is the first step in the process established by the National Research Council. The next step is interim status, followed by final review by the Council's Subcommittee on AEGLs and publication by the Council. Because the review and publication have not been completed for the proposed mustard or nerve agent AEGLs, it would be premature to use them in the accident assessments for the EIS.

Comment BB-13: In Section 5.21.2.4 and 7.21.2.4 on human health and safety, in Tables 5.21.2 and 7.21.2 on pages 5-174 through 5-179 and 7-181 through 7-186, relating to fatality estimates, we note and appreciate the inclusion of the recommended lower LCt_{50} standards by the National Research Council in 1997. [*Documents 115-35, 119-24*]
Response BB-13: Comment is noted.

Comment BB-14: This comment refers to Section 7.21.3 on impacts of accidents during no action (continued storage), specifically p. 7-205, lines 3 through 4, regarding the probability of the bounding accident. As referenced on p. 7-174, lines 22 and 23, the probability equation of 1×10^{-8} equals one occurrence in 100 million years. This explanation of the equation should be used throughout the EIS because it puts the equation into terms the public can better understand. [*Document 115-39*]
Response BB-14: The comment on expressing probabilities in terms that the general public can understand is noteworthy and has been factored into the FEIS in a consistent manner.

Comment BB-15: With regard to p. 7-205 of the ACWA DEIS on lines 10 through 13 on fatality estimates, does the number of estimated fatalities assume that CSEPP procedures have been implemented? [*Document 115-40*]
Response BB-15: With the exception of the assumption on setting the "time after functioning (TAF) parameter" (see response to Document 95-15) use in assessed accident scenarios involving a mustard release, the estimated fatalities presented in the ACWA EIS do not assume any mitigative measures or CSEPP response actions to contain, recover, or remediate an agent spill. Because the TAF values assumed would result in all or most of the agent being released back into the atmosphere, it would be correct to conclude that all of the assessed accident scenarios assume no response mitigation.

Comment BB-16: Regarding p. H-3 of the ACWA DEIS, the range of risk is reasonably estimated by the EPA to be lower than the "all or none" scenario (a plane crashing into the igloo) presented. The likelihood of a conventional accident (a munition is mishandled and a release results) is far greater than the plane crash scenario. The EPA's experience suggests that the range of risk for a typical industrial accident is probably less than one in 1,000. We ask that DOD examine the risk for the very hazardous work involving explosive munitions, where personnel wear "moonsuits," and accidents can and do occur more frequently. [*Document 120-64*]
Response BB-16: The accident assessment in the ACWA EIS is intended to present the consequences of the highest-risk storage and facility accidents. More detailed assessments of risk from an entire spectrum of scenarios (e.g., high-frequency, low-consequence to low-frequency, high-consequence) have been conducted by the Army for some of the incineration facilities (TOCDF Phase I and II risk assessments, for example). Also, under the emergency preparedness programs in place at the sites, impacts from higher-frequency "maximum credible events" (MCEs) have been estimated (see Sections 4.21.3.4, 5.21.3.4, 6.21.3.4, and 7.21.3.4). For these sites, the most probable event would be that a pallet would drop from 4 ft (1 m) inside an igloo. In this MCE, three rounds of munitions would spill their contents onto the igloo floor. In general, agent released from these accidents would not disperse to off-site areas, so the consequences in terms of general population fatalities would be zero. Text has been added to the accident sections to summarize the consequences of these MCE accidents.

Comment BB-17: ACWA uses the same worst-case scenario (airplane crash) instead of a more likely or realistic scenario (i.e., tornado, lightning strike). [*Document 96-48*]
Response BB-17: The accident risk scenarios have been revised to include natural factors (tornado, lightning strike) at ANAD, PBA, and BGAD. The airplane crash scenario has been retained at PCD.

Comment BB-18: In looking at the "bounding accident," the ACWA DEIS focuses on an accident that could occur during operations and includes an accident scenario for the no action alternative. If we accept the fact that the bounding accident is one in which an aircraft would crash into an igloo and have a resulting fire, isn't it just as likely that an aircraft could crash into the demilitarization building or the unpack area, with a resulting fire? This scenario would result in a bounding accident during the operations of a facility far greater than the described minor spills. [*Document 26-22*]
Response BB-18: The accident scenario involving an aircraft crash with a subsequent fire is assessed not only for the no action alternative (continued storage) but also for the proposed action, which involves the same aircraft hitting the container handling building (CHB). For this scenario, the impacts are greater for the igloo strike than for the CHB strike because of the larger agent inventory that would be in storage.

Comment BB-19: Regarding ANAD, the accident analysis given on p. S-66 of the ACWA DEIS appears to be a worst-case scenario and may not be an accurate measure of the probability of a lesser release incident. During the treatment/neutralization phase, a large number of mines, projectiles, rockets, and mortars would be handled. For this reason, we believe more detail should be provided on the probability of a release incident during the repetitive treatment activities involved with handling and preparing these munitions. This possibility should be examined in the final document. [*Document 120-51*]
Response BB-19: The ACWA EIS focuses on catastrophic-scale events that would have a very low likelihood of occurrence. These events would result in much higher consequences than would process-related events, such as the handling of large numbers of munitions in the CHB prior to agent-munitions separation. The consequent assessment results reported for continued storage and for the ACWA process technology are considered bounding in that they represent the worst-case consequences that could be conceived and still be credible (e.g., with a frequency of more than 1×10^{-8} [once in 10 million]). Because of the extensive analysis of process-related accidents in previous and ongoing Army-sponsored risk assessments, these lower consequence events are not assessed in the ACWA EIS.

Comment BB-20: The histories of accidents, which are ignored in both the PCD DEIS and the ACWA DEIS, have inadequately addressed the MCE. The ACWA DEIS identifies an airplane crash into stockpiled weapons as a catastrophic accident, but avoids the more important disclosure of letting people in the area know what could happen as a result of the process. A power loss and systems failure should be considered. [*Document 96-5*]
Response BB-20: The ACWA EIS includes events within the ACWA process as "fluctuating operations," and they are assessed under normal operations. The accident assessment in the ACWA EIS focuses on catastrophic-scale events that would have a very low likelihood of occurrence. These events would result in much higher consequences than would typically occur for scenarios used in CSEPP exercises (i.e., the MCE). The consequent assessment results reported for continued storage and for the ACWA process technology are considered bounding, in that they represent the worst-case consequences that could be conceived and still be credible (e.g., with a frequency of more than 1×10^{-8} [once in 10 million]). The type of process event, a power loss and system failure, given as an example in the comment, would be considered a fluctuating operation. Such events are considered for routine operations in the ACWA EIS.

Comment BB-21: The worst-case accident scenario described in the PCD DEIS (p. I-10) involves the crash of an aircraft into one of the storage igloos, followed by an uncontrolled fire. If this event were to occur, the computed maximum downwind "no deaths" distance would be 31 mi (50 km) for an igloo storing 155-mm projectiles. The ACWA DEIS uses the hypothetical bounding accident of an aircraft crash into the CHB. This scenario lists no deaths from 1 to 12 mi (p. 6-166). It is not clear why the accident scenarios chosen are different and why there is such a difference in the plume resulting from the two different accident scenarios. It would be helpful to provide a little more explanation and make sure the accident scenarios are consistent. [*Document 95-4*]

Response BB-21: The ACWA EIS assesses an aircraft crash with a resultant uncontrolled fire for both a strike into an igloo and a strike into the pilot facility CHB. Although the crash and fire in the CLA and the CHB have a common accident initiator (aircraft crash) and a common model of release to the atmosphere (detonations followed by fire), these accident scenarios are not the same. The maximum site-specific munitions/agent inventory assessed for the igloo strike (e.g., 6,384 155-mm projectiles at PCD) is much greater than the munitions/agent inventory assessed for the CHB strike (e.g., 200 155-mm projectiles). More than 30 times more agent would be at risk for the igloo scenario than for the CHB scenario. The assessed no death distance for the crash into the igloo is therefore about 15 times greater than the no death distance assessed for the CHB accident. The large differences in the estimated impacts, particularly for the igloo strike, between the PCD DEIS and ACWA DEIS are due to differences in modeling assumptions; these are addressed in the reanalysis presented in both FEISs.

Comment BB-22: Section 6.21.1.3, p. 6-166 of the ACWA DEIS indicates, "For all the hypothetical accidents assessed, the no effects plume contour extends into off-post areas (i.e., extending to 30 mi [50 km]). The extent of the no deaths contour varies from 1 to 12 mi [1.6 to 19.3 km], depending on the meteorological conditions assumed."

This section fails to mention that the distance from PCD to Pueblo is 14 mi. In the event of this rare accident scenario, the entire population of Pueblo would be at potential risk for health effects from mustard exposure, with the city portions that would actually be affected depending on the wind direction.

Lines 12–14 state, "This evaluation did not specifically estimate the numbers of nonfatal injuries that would occur for each accident scenario, because there would be great variation in the number and severity of nonfatal injuries, depending on exposure." While it is not possible to predict the number of injuries, it is possible to calculate the distance downwind to a no deaths contour. For several of the scenarios, this distance is given as more than 31 mi (Table 6.21-1). Thus, Table 6.21-2 should include an extra column listing the total population living within 31 mi of the PCD, since all these persons are potentially at risk for injury, depending on the wind direction at the time of the accident. The population at potential risk would include the entire city of Pueblo (Section 6.21.2.4, p. 6-170).

The PCD DEIS does this calculation and discusses the possibility of 5,900 deaths if a very improbable accident were to occur. It mentions a number of other areas, such as the community of Rocky Ford, which are within a 31-mi (50-km) radius of PCD. On p. 4-151, the PCD DEIS lists areas of six other counties that could be affected by a large accidental release. These other potentially affected areas are not mentioned in the ACWA DEIS. The accident presentation in the ACWA DEIS should be revised to be consistent with that in the PCD DEIS. [*Documents 95-10, 95-11*]

Response BB-22: The assumptions used in the accident modeling analysis for both the ACWA and PCD DEISs have been thoroughly reviewed by both of the Army program managers. A consensus was reached on selecting the values to be used for the modeling parameters most sensitive to affecting the estimated accident consequences. The reanalysis conducted on the basis of the revised set of assumptions is reported in the ACWA FEIS.

Comment BB-23: Section 6.21.1.2, p. 6-165 of the ACWA DEIS states that the TAF (time needed to stop emissions of mustard after an accident) is 1 hour. However, Appendix H states that the TAF for PCD is 9 hours (p. H-9). Which is correct? [*Document 95-15*]
Response BB-23: The assumed 1-hour TAF parameter is the default value set in the D2PC model. This value was used in estimating the PCD accident impacts reported in the DEIS. It represents the response time that would typically be needed to cover an agent spill for an MCE. This value is commonly used in CSEPP exercises that deal with evaporative releases of mustard. Because most of the events considered in the EISs involve much larger agent spill quantities and because these events also involve fires with the possibility of heated unexploded ordinance, the munitions and agent containment/response times required for first responders would be much longer. The ACWA FEIS accident analysis assumes a TAF of 20 hours for storage accidents involving an aircraft crash with HD detonation and a fire and assumes 7 hours for the same accident scenario involving the pilot facility. The 9-hour value for TAF represents the time that would be required to produce the largest HD release to the atmosphere from the surface evaporation of the detonation fraction. The footnote on p. H-9 of the ACWA DEIS, which refers to 9 hours as the value used in accident modeling to support the DEIS, is in error. As stated above, the DEIS accident assessment assumes a 1-hour TAF value. Also, as previously stated, the final accident consequences reported in the ACWA FEIS are based on assumed 20-hour and 7-hour TAF values.

Comment BB-24: Though mentioned elsewhere in the document, please cite the source for the "one occurrence in 100 million years" frequency in Section 6.7.1.4 on p. 6-70. [*Document 95-23*]
Response BB-24: One occurrence in 100 million years represents the cutoff frequency for selecting bounding accidents for analysis in the ACWA EIS. For example, a large aircraft crash into an igloo or the CHB at PCD would have a frequency of around 1×10^{-8}. The consequence of such an unlikely event would be very large. Events that would occur less than once in 100 million years are deemed as incredible events in the DEIS and are therefore not assessed. The consequences reported in the ACWA EIS are based on the accident initiator that would produce the largest risk to the surrounding population. The selection of the largest risk initiator was based on the findings from the Phase I quantitative risk assessment conducted under the PMCD program.

Comment BB-25: Perrow (1984) characterizes the overall risk of technological systems along two dimensions. One dimension has to do with how complex a total technological system is in terms of the *interactions among failures* or malfunctions in normal operating procedures and component processes. The second dimension has to do with how *tightly* the separate components within the total technological system are *coupled*.

Neither the documents nor the information given at public meetings provides a sufficient discussion of risk analysis on the basis of these two dimensions of risk. Also, it seems that

discussions at public meetings have not adequately dealt with risk on the basis of this specific type of complexity. [*Document 103-1*]
Response BB-25: Comment is noted.

Comment BB-26: What is the point of analyzing the worst-case scenario, which will probably never happen? [*Document 41-6*]
Response BB-26: The analysis of the worst-case scenario places an upper bound on the impacts that might occur, and this is part of the comparison of alternatives, including no action. The likelihood of occurrence is another aspect of calculating the risk associated with an event.

Comment BB-27: Regarding Volume 4, Section 4.2.1.5, p. 31 of the TRD (Kimmell et al. 2001), the explosion hazard of hydrogen from neutralization should be treated more completely. There may be an explosion hazard from hydrogen adsorbed on charcoal. [*Document 77-15*]
Response BB-27: The TRD says that "air would be pulled through the ERH [energetics rotary hydrolyzer] to remove hydrolysis vapors and fumes, including hydrogen produced from the hydrolysis of aluminum burster wells that make up some projectiles." Maintenance of sufficient air flow would ensure that the hydrogen concentration remains well below the lower explosive limit for hydrogen.

Comment BB-28: With regard to accident scenarios, does the greater risk come from the crash and spread of agent or from the resulting fire? [*Document 26-23*]
Response BB-28: Although more than 90% of the agent would be destroyed by the fire, the release of the remaining agent to the atmosphere would cause greater off-post impacts than the portion of agent that would be released to the atmosphere in a scenario without a fire.

Comment BB-29: The agricultural risk assessment or accidents impacts analysis should take into account the potential impact of an accident on farmlands and agricultural workers, many of whom, by virtue of their socioeconomic status and work histories, may be more vulnerable to exposures to hazardous substances. In particular, care should be taken to understand the nature of the work force close to PCD and to incorporate this understanding into the numbers regarding potential accidents. [*Documents 120-12, 135-12*]
Response BB-29: Comment is noted. The doses used to calculate health effects from accidents in the ACWA EIS were adjusted to account for sensitive members of the population.

Comment BB-30: Insufficient data are available on socioeconomic impacts as the result of an accidental spill. Although the ACWA DEIS indicates that the release of mustard would be negligible for a small community, the effects could be devastating. [*Document 96-11*]
Response BB-30: Section 6.21.2.9 discusses the socioeconomic impacts of an accident at PCD.

Comment BB-31: It seems that the impact on clams following an accident at BGAD is inconsistent with accident impacts presented in earlier sections of the DEIS. Specifically, it seems that the impacts would be greater from an aircraft crash into a storage igloo than into the CHB during operations. [*Document 115-38*]
Response BB-31: The impacts on clams would be greater for an aircraft crash into the CHB than an igloo because of the quantity of mustard and GB present at any given time and the plume area for the 1% human lethality contour and no deaths contour based on model projections of airborne

concentrations. The GB 1% lethality plume area would be 9.52×10^7 m^2 following a crash and fire at a storage igloo, compared with 5.17×10^7 m^2 following a crash and fire at the CHB. A storage igloo is assumed to contain 31,480 lb of GB, compared with 21,924 lb in the CHB. Clams in water within the 1% lethality and no deaths plume areas would be exposed to higher deposition amounts of GB and mustard from an aircraft crash into the CHB than from deposition following an aircraft crash into a storage igloo.

Comment BB-32: Pages 4-209 through 4-211 of the ACWA DEIS contain text that states, "Sufficient data are not available to determine whether children or the elderly are actually more sensitive to the toxic effects of an acute chemical agent exposure than the rest of the population." While direct data may be unavailable, many pesticide compounds have very acute toxic effects similar to those of CWAs. There are well documented incidents, and appropriate toxicological and scientific correlations to sensitive populations could be made that would help the ACWA EIS correctly assess exposure risks. Table 4-21.2 is not very useful or realistic, since it does not characterize fatality estimates for persons other than healthy adult males. The EIS should address health effects for sensitive subpopulations. [*Documents 40-9, 120-59, 120-60*]
Response BB-32: The potential increase in fatalities that would be expected if some portions of the population exposed to an accidental release of agent were 10 times more sensitive than healthy adult males is estimated and presented in Appendix H of the EIS. For all four ACWA storage sites, the predicted fatalities increase by factors of about 1.2 to 2.5. These estimates are provided to account for impacts to sensitive subpopulations. However, as acknowledged in the comment, direct data on differences in the potency of acute exposures to mustard or the organophosphate nerve agents for different age groups are not available. On the basis of the analyst's knowledge, such data are also not readily available for organophosphate pesticides. However, even were such data available, they would not be conclusive with respect to the nerve agents and would not pertain to mustard. Therefore, it is felt appropriate to retain the caveat that the sensitivities of children and the elderly are unknown.

With respect to chronic low-level exposures from normal operation emissions, sensitive subpopulations are addressed in Sections 4.7.2.2, 5.7.2.2, 6.7.2.2, and 7.7.2.2.

Comment BB-33: There is no way that everyone could be protected in the event of an accident or a spill. [*Document 111-3*]
Response BB-33: Comment is noted. The ACWA EIS addresses the health effects, including the number of deaths for accidents involving release of agent.

Comment BB-34: In the event of a release at BGAD that creates off-site evacuation, we have several concerns that are not specifically addressed in the ACWA DEIS. First is the issue of the capacity of our roadways to provide for complete or partial evacuation. Duncannon Lane and US 25, which are major roadways around BGAD, are both beyond capacity. Plans have been made to substantially upgrade both roads, but realistically, they are scheduled for completion too many years down the road to benefit during Chemical Demilitarization. The last thing that all concerned can accept is for these two roads to be under construction at the time of chemical weapons disposal. Efforts must be made by the Army to expedite these two projects to assure their completion by the time construction of its disposal facility begins. This is a reasonable expectation given the time frame involved in choosing a technology and obtaining an air quality permit. [*Document 112-14*]

Response BB-34: Comment is noted.

Comment BB-35: I am a shut-in and also have very bad allergies; bad air makes breathing difficult. My home, air distance, is not more than 5 mi from PCD, and I expect an accidental release of agent would kill me and my husband. Also, a person, if burned, could perhaps boil water if needed, but he or she could do nothing about poisoned air. [*Document 75-5*]
Response BB-35: The Army and the Federal Emergency Management Agency (FEMA), along with the local community, have been working closely together for more than a decade to ensure that the health and safety of the public in the community and the workers at the depot are protected as long as chemical munitions remain at PCD. The continued safe storage of the chemical weapons stockpile and the safe handling of munitions in preparation for destruction are of paramount importance to the Army. This pledge is reinforced by the Army's continued commitment to CSEPP. The worst-case accident scenarios postulated in the ACWA EIS are extremely low-probability events.

Comment BB-36: Please provide more details as to what the revision of the Chemical Accident/Incident Response and Assistance Plan may look like with regard to accidental releases to the air. When will it be available? [*Documents 95-22, 96-44*]
Response BB-36: The *Pueblo Chemical Depot Chemical Accident/Incident Response and Assistance Plan* (PCD-CAIRAP), published in April 2001, addresses the emergency actions required to effectively respond to the full range of potential chemical accidents or incidents, including accidental air releases. The reference has been updated in the EIS.

Comment BB-37: ACWA does identify the Transportation Technology Center (TTC) just north of PCD as having the potential of exposure in the event of an accident, but does not say to what extent those employees will be trained or prepared in the event of a chemical accident. Also, who would conduct training for those employees? And what precaution or measures has TTC been advised of to address this issue? [*Document 96-47*]
Response BB-37: The Chemical Stockpile Emergency Preparedness Program (CSEPP) for PCD addresses appropriate emergency response measures and training for the areas surrounding the depot, including the TCC.

Comment BB-38: Regarding human and health risks and emergency response, the ACWA DEIS indicates that there is a memorandum of agreement with the Boone Volunteer Fire Department (BVFD) to provide emergency response assistance to PCD. There is no information as to the training and qualifications BVFD has in dealing with the type of emergency that would most likely arise at PCD; therefore, it is impossible to determine if this assistance could be reasonably counted upon. There is no information regarding the TTC Fire Department and the Pueblo Rural Fire Department's training and qualifications as well.

Regarding human and health risks, there are some discrepancies in data between the ACWA DEIS and the PCD DEIS. Both the ACWA and PCD DEISs refer to the Bureau of Labor Statistics, reported by the National Safety Council, to calculate their estimates. But there are major differences in the estimates given by each. The first example is ACWA (Section 6.7.2.1, Table 6.71, p. 73, Worker Injuries and Fatalities during Construction), which shows Neut/Bio injuries (19), Neut/SCWO (18). PCD (Section 4.9.2.1, Table 4.16, p. 52) shows Neut/Bio (48), Neut/SCWO (44), Baseline (60), and Mod/Baseline (45). Also, in the PCD DEIS, the number of

injuries listed during operation of the neutralization processes is listed as 82, but in the ACWA DEIS, the number is listed as 30. What is the reason for the discrepancy in these figures? [*Documents 96-28, 96-39, 101-28, 101-29*]

Response BB-38: Regarding emergency response, the PCD Fire Department has Mutual Aid Agreements with the BVFD, TTC Fire Department, and Pueblo Rural Fire Department to fight land wild fires and structural fires both on and off post. However, these agreements do not include any assistance in responding to the chemical storage area of a demilitarization plant. In the event of a chemical incident that would require all assets of the PCD Fire Department, one or several of these entities might be asked to provide fire/medical aid coverage to the depot administrative areas. None of these departments has the proper PPE for an unknown agent atmosphere. Pueblo County, through CSEPP, has purchased PPE for the Boone, Pueblo County Rural, City of Pueblo, and Pueblo West Fire Departments. This equipment is to be used to staff the mobile personnel decontamination stations and hospital decontamination station supplied through CSEPP. The State of Colorado Office of Emergency Management, Pueblo County Department of Emergency Management, and Pueblo County Health Department have provided training on first responder, PPE, and the treatment of chemical injuries to fire, medical, and law enforcement personnel in the county.

Regarding the number of injuries reported in the ACWA DEIS, the values reported were annual values. The PCD DEIS reported total values.

Comment BB-39: According to p. 7-83, line 18, BGAD is staffed at all times with four (4) firefighters. Lines 21 and 22 state that BGAD has mutual aid agreements with local fire departments and medical facilities to augment its emergency services. It appears by the numbers that BGAD is inadequately staffed to effectively handle an emergency and would therefore be relying on the City of Richmond Fire Department, as spelled out in the mutual aid agreement.

The City of Richmond is currently pressed to maintain its present ISO fire classification (Class 3) with the number of fire personnel and equipment it has in the city's fire department. Additionally, the Richmond Fire Department has been identified as the entity to take a major role in the field decon for emergency workers and evacuees. This undertaking alone requires several of the city's personnel. CSEPP has been very beneficial in planning, securing warning equipment and necessary items. However, the emergency response personnel and equipment are not in place to handle a substantial evacuation. Funding for these emergency services does not exist in the City of Richmond's budget. For public safety to be provided, there must be an investment in the resources cited above before chemical demilitarization at BGAD begins.

Preliminary estimates by the City of Richmond emergency personnel indicate a need for 16 additional personnel (estimated $476,000 per year), one new pumper (estimated cost $250,000), one aerial firetruck (estimated cost $450,000), and one new building to house police and fire administration substation (estimated cost $1,000,000). The existing Madison County Emergency Operations Plan, Annex Q, Hazardous Materials, III, Direction and Control, states that direction and control for hazardous material incidents is shared between local and state authority. Locally, efforts will be coordinated by Fire Services in these respective jurisdictions. This clearly mandates that an emergency within the community created by Chemical Demilitarization Activities at the Depot is the responsibility and jurisdiction of the Richmond Fire Department. To date there has been no investment in training, equipping or contracting facilities adequate to respond to a chemical emergency at the BGAD or within the City of

Richmond, thus leaving our mutual aid agreement worthless. We submit that public safety will not be assured during chemical demilitarization unless there are significant investments into the City of Richmond emergency services.

Additionally, we are concerned that the City of Richmond's emergency service personnel have not been provided with sufficient gear to handle a chemical emergency. These emergency service people, who must be relied on to carry out every aspect of an evacuation situation from directing traffic to providing trauma care, are not equipped or trained to do so. Without our emergency service personnel being adequately supplied with equipment and training, we risk total loss of our emergency medical services (EMS) personnel. It is reasonable to assume the emergency personnel could don this equipment at the Depot. They must be provided off-site access to personnel protection equipment and facilities to address an emergency.

Until realistic discussions begin to address the physical and monetary considerations involved in protecting our people and the environment, this community stands unprepared for chemical demilitarization. [*Document 112-12, 112-13, 112-15*]

Response BB-39: The concerns stated in this comment regarding emergency preparedness are not within the scope of the ACWA EIS. A summary of CSEPP is provided in the EIS.

Comment BB-40: Regarding Sections 5.7.1.4 and 7.7.1.4 on emergency response and the protective action recommendation (PAR) on pages 5-76 and 7-82, it has come to our attention that the PAR would be based on a CSEPP guidebook for BGAD and PBA and their surrounding communities that is yet to be released. The guidebook would define procedures to determine the PAR. Information on the guidebook currently offered for CSEPP at the Anniston, Alabama, site has caused significant controversy with regard to assumptions, including, but not limited to, the toxicity standards being used to determine the PAR. If such a guidebook exists for BGAD and PBA and the surrounding communities, it should be provided in its entirety as part of the ACWA FEIS. [*Documents 108-15, 112-11, 115-16, 115-17, 119-16*]

Response BB-40: Comment is noted; however, the development of any CSEPP documents is external to this NEPA process. These documents were not available in a format that could be referenced in either the DEIS or FEIS.

Comment BB-41: Regarding p. 4-204 of the ACWA DEIS, while the likelihood of a macro-scale accident is extremely small, what contingency plans would be implemented to help mitigate the adverse impacts of a release on the future land uses of affected parcels? [*Document 120-57*]

Response BB-41: FEMA, the Army, and state officials are working closely to formalize existing guidance in this area. This guidance is basically covered in the *CSEPP Re-Entry/Restoration Plan Workbook*, and action to finalize this document is one recommendation being considered by the Re-Entry/Recovery Working Group in dealing with agricultural, safety, and related recovery/re-entry/restoration concerns.

Comment BB-42: In terms of accidents, what measures and plans exist for the safety of farm workers in the fields? [*Document 96-6*]

Response BB-42: The development of safety plans for the public is not within the scope of this document. CSEPP has developed a plan for the area. A discussion of emergency response for Pueblo is discussed in Section 6.7.1.4 of the ACWA EIS.

Comment BB-43: Where appropriate, the ACWA DEIS describes common generic safety systems, such as the cascade ventilation system, that would be used regardless of the technology chosen. Nevertheless, we are somewhat unsure of how the decision makers would equitably consider all health and safety risks associated with each of the alternatives during actual operations. For example, are the traffic concerns for all destruction alternatives equal? That is, would secondary wastes being trucked off site or supplies being trucked on site be essentially the same and therefore pose similar road safety or community spill risks? Volumes 2–5 of the TRD (Kimmell et al. 2001) for the ACWA EIS looked at some transportation impacts associated with the various technologies at the sites being considered. However, it is unclear what variations in operations, particularly for truck traffic, would be associated with each alternative. We have no way of assessing the carcinogenicity risk associated with the diesel emissions from the trucks. Is such a risk insignificant for any alternative selected? (Note: It was suggested at a recent NIEHS/EPA technical seminar that a significant part of the airborne carcinogenicity risk in the United States comes from diesel emissions.) [*Document 25-2*]

Response BB-43: Although the TRD provides some estimates of impacts from transportation for the various technologies, the overall impacts for each technology were not summarized. To address this concern, the annual vehicle miles traveled (including construction delivery shipments and worker vehicles during construction and operation) and the annual operations shipments (for both raw materials and wastes) were tabulated for each technology and site. The annual vehicle miles traveled for Neut/SCWO, Neut/GPCR/TW-SCWO, and Elchem Ox were very similar. For annual shipments, Neut/SCWO and Neut/GPCR/TW-SCWO were quite similar (difference of 10% to 20%). However, Elchem Ox would require a significantly smaller number of shipments, approximately 40% to 60% fewer than the others. Therefore, since the carcinogenic risk from emissions is related to the number of vehicle miles traveled (and the number of shipments), the transportation risk associated with Elchem Ox would be somewhat lower than those risks associated with the other technologies. For Pueblo, the number of shipments for Neut/Bio would be about 75% of those required for Neut/SCWO, so transportation risks for Neut/Bio could also be concluded to be somewhat lower.

The assessment is somewhat generic and assumes that the raw materials and waste shipment distances would be similar for each of the alternatives. This assumption is necessary because actual origin and destination locations are currently unknown. Therefore, at this time, the data do not support risk calculations using diesel emission factors. However, a more detailed discussion of the potential transportation impacts has been added to the FEIS.

CC CUMULATIVE IMPACTS

Comment CC-1: We disagree with the ACWA EIS findings on the maximum carcinogenic risk for a baseline incinerator, as cited in Appendix H of U.S. Army (1997). We believe that if a corrected methodology and corrected modeling had been integrated into the cited assessment, baseline incinerator operations would result in the risk of more than the 1×10^{-6} standard generally considered representative of negligible risk. Therefore, an ACWA pilot plant operating simultaneously with a baseline incinerator at PBA would result in baseline incinerator operations at a risk level higher than the level of 6.2×10^{-7} stated in this section. [*Documents 108-28, 108-29, 108-32, 115-48, 119-32,*]

Response CC-1: The methodology used in assessing risks from JACADS emissions was very conservative; that is, it overestimated risks. Since data on installation-specific risks for ANAD and BGAD were not available, the JACADS risks were selected as reasonable indicators. We know of no reason to suspect that the JACADS analysis or its summary in Appendix H of U.S. Army (1997) are incorrect, nor do we know of published studies providing significantly different results. The cumulative impact analysis for the ACWA EIS found that cumulative health impacts for the operation of an ACWA pilot test facility and an incinerator would be low.

Comment CC-2: We strongly feel that a baseline incinerator, in combination with other technologies, would have significant environmental justice implications within 30 mi of a site. As witnessed in Anniston, Alabama, where a baseline incinerator is constructed and about to go on line, direct negative economic impacts are manifesting themselves: lower property values, inability to sell homes, inability to attract new businesses, population decreases, etc. Similar impacts would be expected with 30 mi of other sites. Therefore, we feel strongly that high and adverse consequences within the scope of environmental justice would exist should a baseline incinerator be considered in the cumulative impacts of this EIS. [*Documents 108-32, 115-55, 115-56, 115-57, 119-37*]

Response CC-2: Neither the EIS for a baseline incinerator at PBA nor the EIS for a baseline incinerator at ANAD found that significant adverse health or socioeconomic impacts would result during normal operations. As discussed in Sections 4.7, 4.19, 5.7, 5.19, 7.7, and 7.19, this ACWA EIS found no significant adverse socioeconomic impacts associated with any of the ACWA technologies at these sites. Nor were any significant adverse human health impacts, socioeconomic impacts, or environmental justice concerns identified when the cumulative impacts of concurrent operation of an ACWA pilot test facility and a baseline incinerator were considered (Sections 4.22.14, 5.22.14, and 7.22.14). No environmental justice concerns have been identified.

Section 4.19 addresses many of issues raised in the comment, which concern socioeconomic topics at ANAD. That section does indeed note that the city of Anniston has experienced a decline in population, but that decline has been occurring since at least 1980 — well before any incinerator was constructed, a finding that calls into question the assertion that such changes are a direct consequence of an incinerator. Declining population is often accompanied by lessened demand for housing, reduced attractiveness to new business, and so on. Moreover, although 2001 data are as yet unavailable, Section 4.19 notes that employment and personal income in Calhoun County had increased through the late 1990s. Thus, it is uncertain that a general socioeconomic decline is occurring, either at the community or county level, and

when indicators are falling, it is unclear whether the fall is associated with the presence of an incinerator at ANAD or had become established earlier. The EIS preparers conclude that it is inappropriate to attribute high and adverse environmental justice impacts at ANAD to construction of an incinerator.

When the socioeconomic impacts of ACWA construction and operation are added to the baseline conditions at ANAD (which include an incinerator), high and adverse socioeconomic impacts are not anticipated. When other reasonably foreseeable future actions are also included, significant cumulative environmental justice impacts are also not anticipated.

Comment CC-3: We strongly disagree with the assumption that maximum agent releases from a baseline incinerator would be similar to those of an ACWA pilot test facility (p. 4-247, lines 27 through 28; p. 5-207, lines 7 through 10; and p. 7-229, lines 3 through 5). ACWA facilities have only one delivery pathway for agent to escape into the environment (via the filter farm stack) during operations. Baseline incineration has the heating, ventilation, and air conditioning (HVAC) stack and a common stack (furnace stack), both of which vent into the atmosphere. In addition, ACWA technologies provide significantly greater control of the agents during processing; do not have two competing air flow systems; rely on automatic waste feed cutoffs to stop agent processing; do not accumulate agent in a common stack pollution filter system (PFS); do not create the risk of such accumulated agent escaping during a process upset; do not rely on isolation valves to curtail agent movement during or immediately after processing; do not have agent being injected under pressure into an open-ended treatment system; do not allow treated agent gases at varying destruction and removal efficiencies (DREs) to escape directly into the environment; do not process agent in a high-velocity air-movement system; are not dependent on afterburners, scrubbers and other pollution abatement systems (PASs) to modify chemical configurations possibly containing agent to prevent agent releases; do not treat agent under high pressure or high temperature; and other factors. We strongly recommend that this statement be modified to more accurately reflect the significant difference in the potential maximum agent release from baseline incineration when compared to ACWA applications. [*Documents 108-30, 108-31, 115-49, 115-50, 115-51, 119-34, 119-35*]

Response CC-3: The comment considers maximum emissions of agent during normal operations. Both an ACWA pilot facility and a baseline incinerator would have a filter farm stack on the munitions demilitarization building (MDB). Both the MDB for an ACWA technology and that for a baseline incinerator are evacuated through a PAS. The preliminary cumulative impact analysis considered these filter farm stacks. However, as the comment notes, a baseline incinerator would have an additional common stack venting the furnaces. The text in Sections 4.22.6.2, 5.22.6.2, and 7.22.6.2 has been changed to reflect emissions from the common stack of a baseline incinerator. Similar changes have been made to the text in Section 6.22.6.2.

Comment CC-4: The statement is made that "there is no evidence that impacts considered in this EIS affect minority and low-income persons any differently than they would affect other persons." Did the analysis consider that poor and minority populations may have increased vulnerability to environmental insults due to social and economic circumstances? Issues for consideration include low-birth-weight babies, inadequate nutrition, cultural practices, and limited access to health care. [*Document 120-36*]

Response CC-4: The ACWA DEIS team considered issues such as those identified in the comment during the preparation of the document. At present, evidence that either minority or

low-income populations respond differently to agent or other toxic emissions such as those associated with either the proposed action or the no action alternative does not exist (see Section 6.20.0), precluding a specific analysis that incorporates the factors noted in the comment. However, the analysis of human health impacts considered impacts of exposure by potentially sensitive subpopulations to toxic air pollutants (see Section 6.7.2.2). That analysis included factors to account for such subpopulations, including the incorporation of conservative uncertainty factors and concentrations nearly twice those assumed for normal adults. Neither factor led to the identification of significant impacts. In lieu of specific data on how minority or low income populations respond to the types of human health impacts considered in this document, the conservative analysis approach used in this EIS addresses such concerns in the best manner possible at present. The text in Section 6.20.2 has been modified to discuss the incorporation of potentially sensitive subpopulations more fully.

Comment CC-5: At PCD, there is a regional environmental context created by power plants, a steel factory, and a number of cement factories. Building and operating a chemical weapons incinerator at PCD would release pollutants that would interact with pollutants released by other regional polluters. No information is available on these interactions. [*Document 17-2*]
Response CC-5: Sections 6.5.1.2 and 6.5.1.3 provide information on current emissions and air quality in Pueblo County. Air quality would improve as a result of the shutdown of blast furnaces and basic oxygen furnaces at the Rocky Mountain Steel Mill. The air impact analysis in Section 6.5.3 accounts for the interaction of ACWA facility emissions with those of existing sources by adding the modeled impact of an ACWA facility to a background level that includes the overall impact of these regional sources. Section 6.22.5 adds the potential impacts of an incinerator to the background level and to the impacts of an ACWA facility and thus accounts for the interaction of regional sources, an ACWA facility, and a baseline incinerator.

Comment CC-6: NEPA requires full disclosure analysis and discussion of the cumulative impacts of an operation. The ACWA document considers only the pilot-testing phase. All reasonable outcomes of the decision to construct a pilot facility must be evaluated. The chances are that at the end of the pilot phase, should an ACWA technology be used, the plant will go into full-scale operation. The document doesn't consider the impact of full-scale operation and needs to include an analysis of the impact of the full-scale operation in addition to the pilot phase. [*Document 40-10*]
Response CC-6: Section 8 of the EIS addresses the potential future of an ACWA pilot facility. As noted in that section, any option for continued use of an ACWA pilot test facility is speculative and subject to a number of constraints, including negotiations between the involved state and the Army. Whether or not an ACWA system could be used for stockpile destruction would be determined by the pilot test. Whether or not an ACWA system would be used for stockpile destruction would depend on many factors, which are beyond the scope of this EIS. Whether any option for continued use would be proposed is speculative. Because of these uncertainties, the ACWA EIS assumes that the pilot test facility would be at an operational scale and operate for three years. This assumption was made to provide an indication, based on early designs, of the impacts of an operating facility. The EIS is not incomplete in this respect.

Comment CC-7: If built, an ACWA pilot test facility would be redundant with the PBCDF. What would the environmental impact of the construction of that facility be, considering that the second facility would not really be particularly necessary? [*Document 78-2*]
Response CC-7: Sections 5.2 through 5.20 of the EIS describe the environmental impacts from the construction and operation of an ACWA pilot test facility at PBA. Section 5.22 describes the cumulative impacts that would occur with other actions, including operation of the PBCDF. The EIS projects the expected impacts if the ACWA pilot test facility were built and operated. The decision to build or not build such a facility at PBA remains open.

Comment CC-8: Section 6.22.5.1 discusses the interaction of the ACWA technologies in combination with other air pollution sources in the area such as the new Rio Grande Cement Plant. This section should also address the Rocky Mountain Steel Mill. [*Document 95-16*]
Response CC-8: Section 6.5.1.3 notes the significant improvement in air quality since the shutdown of blast furnaces and basic oxygen furnaces at the Rocky Mountain Steel Mill. Operations at the mill affect the background air quality levels used in the air impact analysis in Section 6.5.3. The cumulative analysis builds off this air impact analysis and thus includes the impact of the mill.

Comment CC-9: The DEIS indicates that there would be negative cumulative impacts in which water might be diverted from other projects and that there might be higher water prices. However, there is no indication what the other projects might be, and the effect on agriculture is unclear. In addition, there are no indications as to the socioeconomic impacts of higher water prices. These impacts are claimed to negligible, but there are no data to support this statement, and there is no indication as to whether extreme conditions, such as several years of drought, were considered. [*Document 96-18*]
Response CC-9: The comment relates to groundwater. Section 6.11.3 discusses the impacts from constructing and operating an ACWA pilot test facility on groundwater and finds them negligible, since withdrawals would be short-lived and significantly less than historical withdrawals. The potential diversion of water from other users is noted in the discussion of cumulative impacts in Section 6.22.10, in the context of PCD purchasing water rights from holders of more senior water rights who sell their water on the open market. Diverting water from other users is not a negative impact. The holders of these rights would be compensated at a level they deemed adequate, and they would not be required to sell.

Comment CC-10: There are no data regarding cumulative impacts on crops, livestock, or grazing land from emissions. The impacts on surface water or groundwater as they relate to livestock and crops are unclear. [*Document 101-2*]
Response CC-10: A new section that addresses impacts on agriculture from emissions from an ACWA pilot test facility has been added to the FEIS. Section 6.22.11 discusses the cumulative impacts on surface water from the concurrent operation of an ACWA pilot test facility, a baseline incinerator, and other reasonably foreseeable actions. No withdrawals from or discharges to surface waters are expected, and cumulative impacts should be negligible. Section 6.22.10 discusses the cumulative impacts on groundwater. There should be only negligible cumulative impacts on groundwater, since withdrawals would be short-lived and significantly less than historical withdrawals. There would be a potential diversion of water from other users, possibly including agricultural users, as holders of more senior water rights sell

water on the open market. These holders would not be required to sell their rights and would do so only if they received a level of compensation they deemed adequate.

Comment CC-11: The cumulative impacts from constructing and operating a chemical destruction facility should account for the massive amount of construction that is scheduled to take place along I-25 over the next 10 years. This construction could limit worker availability and material availability. In addition, cumulative impacts should include increased costs for construction of off-post facilities, particularly housing. [*Document 26-29*]
Response CC-11: While it may be the case that new development is scheduled to take place along the I-25 corridor, there is little hard evidence on the scale and construction schedule for these developments. Much of the activity that may actually occur, such as new residential and commercial development, is likely to take place incrementally, with no major new commercial or residential developments placing excessive demands on the local labor force during construction and operation of an ACWA facility.

Comment CC-12: The construction and operation periods for an ACWA pilot test facility listed in the introductions to Section 5.22 and 7.22 and the corresponding Sections 5.23.3 and 7.23.3 are inconsistent. [*Documents 115-41, 115-42, 119-28*]
Response CC-12: At all sites, an ACWA pilot test facility would require about 34 months for construction and about 36 months for pilot testing operations. The text in Sections 5.23.3 and 7.23.3 has been changed to reflect a total time of about 5.7 years. Similar changes were also made in Sections 4.23.3 and 6.23.3.

Comment CC-13: We disagree with the statement that emissions from a baseline incinerator would be "small." Small is an inappropriate term in the context of emissions and deposition. Small amounts of dioxin, mercury, PCBs, etc. can have a profound impact on wildlife and their habitat, reproductive capability, and the like. [*Documents 110-1, 115-52, 115-53, 115-54, 119-36*]
Response CC-13: As the comment notes, for each of the ecological impact areas discussed in Section 7.22.12, the crucial consideration is the potential for impacts, not necessarily the quantity of emissions. For each impact area, the cumulative analysis looks at the potential impacts of the ACWA technologies as identified in this ACWA EIS. Since an EIS for a baseline incinerator at BGAD has not yet been published, information on post-specific impacts was not available. The emissions for a baseline incinerator at BGAD were assumed to be reasonably close to those for one at ANAD, PBA, or JACADS. Emissions at these levels would result in air concentrations and potential deposition well below levels that would adversely affect biological resources. The text in Section 7.22.12 has been modified to clarify this point.

Additional modifications have been made in Sections 4.22.12 for ANAD and 6.22.12 for PCD. For ANAD, U.S. Army (1991) found no adverse impacts on ecological resources during routine operations of the baseline incinerator. This conclusion does not depend on the quantity of emissions. The unnecessary characterization of the emissions as "small" has been removed from the discussions. Similar changes have been made for PCD on the basis of U.S. Army (2001). Complete citations for the references follow:

• U.S. Army, 1991, *Final Environmental Impact Statement for Disposal of Chemical Agents and Munitions Stared at Anniston Army Depot, Anniston, Alabama,* U.S.

Army, Program Manager for Chemical Demilitarization, Aberdeen Proving Ground, Md., May.

- U.S. Army, 2001, *Draft Environmental Impact Statement for Destruction of Chemical Munitions at Pueblo Chemical Depot, Colorado,* U.S. Army, Program Manager for Chemical Demilitarization, Aberdeen Proving Ground, Md., May.

Comment CC-14: The DEIS deems the risks associated with the JACADS incinerator and an ACWA pilot test facility negligible on the basis of a maximum carcinogenic standard. However, this analysis does not appear to specify the increase in risks associated with increased accidents or risks from running two treatment systems simultaneously. There are potentially synergistic risks associated with running two different types of treatment processes at the same time that should be examined. [*Document 120-63*]

Response CC-14: The analysis in Section 4.22.6.2 addresses the risk associated with operating a baseline incinerator and an ACWA pilot test facility simultaneously under normal operating conditions. The maximum carcinogenic risk to on-post and off-post populations associated with operating an ACWA pilot test facility and a baseline incinerator simultaneously would be 1×10^{-6}, close to the lower end of the range for residual carcinogenic risk of between 1×10^{-6} and 1×10^{-4} (one in 1 million to one in 10,000) that is used by the EPA to determine whether cleanup of hazardous waste sites is warranted. This total risk would still generally be considered negligible.

As noted in the introduction to Section 4.22, accidents are low-probability events whose exact nature and time of occurrence cannot reasonably be foreseen. Cumulative impacts were not assessed for accidents.

DD AGRICULTURE

Comment DD-1: The agricultural impact assessment being done by the U.S. Army Center for Health Promotion and Preventive Medicine should have been done prior to the PCD DEIS and ACWA DEIS, and the results should have been included in them. Will this assessment include data on cumulative impacts? [*Document 101-5*]
Response DD-1: The agricultural assessment being planned for PCD is in response to a requirement by the State of Colorado for an incinerator. The agricultural assessment is being conducted by the Army with the cooperation of ACWA. In response to comments on the ACWA DEIS, a new section on agriculture has been added to the ACWA FEIS that incorporates agricultural assessments from the ACWA DEIS and adds an assessment of routine operational and accidental releases.

Comment DD-2: At a Working Integrated Product Team (WIPT) meeting in Colorado, a request was made for copies of the protocol for the agricultural assessment to be provided to the CAC and the community prior to final approval. The request is repeated here for the record. [*Document 31-2*]
Response DD-2: The request is noted.

Comment DD-3: I understand that an agricultural assessment is being prepared to determine the agricultural impacts associated with at least some portion of the chemical depot process. [*Document 31-1*]
Response DD-3: PMCD, with the cooperation of PMACWA, is currently preparing an agricultural work plan for sampling agricultural products during piloting. This will provide information on the potential deposition associated with the daily operation of a pilot facility.

Comment DD-4: There is no information provided on possible impacts to our farming community. The area near PCD is heavily used for ranching and farming. There are no data regarding cumulative impacts on crops, livestock, or grazing land from emissions. The impacts to surface water or groundwater as they relate to livestock and crops are unclear. [*Documents 7-3, 10-1, 31-3, 39-2, 43-1, 43-4, 50-3, 72-3, 95-6, 96-8, 96-10, 96-68, 101-1, 101-2, 101-3, 106-4, 109-3, 120-1, 135-1*]
Response DD-4: All information related to agriculture has been organized into a new section for each site. Descriptions of the characteristics of the installation agricultural economies are provided in Sections 4.23.1.7, 5.23.1.7, 6.23.1.7, and 7.23.1.7 of the ACWA EIS. The socioeconomic impacts of an accidental release of chemical agents to the environment are discussed in these sections. Impacts discussed include those that would occur to agriculture in a multicounty region of influence following the loss of one year's worth of agricultural output as a result of actual or perceived crop and livestock contamination. If PCD were chosen as the site for an ACWA pilot test facility, additional design and environmental studies would be performed. PMCD with the cooperation of PMACWA, is conducting an agricultural assessment for PCD.

The new agriculture sections include an assessment of whether normal operations of an ACWA pilot test facility would cause any benchmark values for impacts on plants or animals to be exceeded, including food-chain bioaccumulation.

Comment DD-5: The five counties included in the agricultural impacts section in the ACWA DEIS were not identified, and minimal information was provided on impacts. [*Documents 26-12, 96-12, 101-4*]
Response DD-5: The five counties are identified in the ACWA FEIS in Appendix G, Table G.1. Impacts on agriculture are included in a new section of the FEIS that draws together material in several disciplinary areas.

Comment DD-6: An agricultural risk assessment should consider (a) deposition of destruction by-products that could affect livestock or crops for both the short term (during operations) and long term (soil deposition); (b) the potential public or market perception that destruction by-products have affected livestock or crops (the perceptions of wholesalers, distributors, and retailers that products might be grown in contaminated soils can affect the marketability of the farm products marketed across the country); and (c) specific crops and livestock operations that are present in the Pueblo area, including those involving crops used as feed. Our discussions with the Pueblo community indicate there is some concern regarding the potential risks or lack of risks to the public and to potential customers for agricultural products. This concern is probably the case at the other sites as well. An independent third-party review of the agricultural impact assessment may help avoid public perception problems. [*Documents 120-10, 120-11, 135-10, 135-11*]
Response DD-6: An agricultural risk assessment has been initiated for PCD by PMCD with the assistance of ACWA. It is being done for the State of Colorado Certification of Designation for an incinerator. Your comments regarding the content of an agricultural risk assessment are noted. For the ACWA FEIS, agricultural impacts have been placed in a new section. Additional assessments of the impacts of routine emissions and accidents on agriculture have been added.

Comment DD-7: Citizens in the agricultural community should have the opportunity to participate in discussions regarding any agricultural assessment being conducted at PCD. [*Documents 39-5 39-6*]
Response DD-7: An agricultural risk assessment has been initiated for PCD by PMCD with the assistance of ACWA. It is being done for the State of Colorado Certification of Designation for an incinerator. This activity includes sampling soil, water, and agricultural products. A work group that includes local farmers has been formed to develop a protocol for the agricultural assessment.

Comment DD-8: Incineration technologies could affect agriculture during normal operations or if there were an accident. It also appears that this damage could be prevented by employing one of the neutralization technologies. Buyers of our products have already indicated that they are concerned about the possibility of incineration, and others have stated that they will cease buying our products. The ACWA EIS is missing an assessment of impacts to agriculture. This issue should be addressed. [*Documents 10-3, 12-1, 29-7, 39-2, 39-3, 40-6*]
Response DD-8: Incineration is not a technology alternative in the ACWA EIS, and the impacts of incineration are not addressed. Section 6.21.2.9 of the ACWA DEIS addresses the potential economic impact from a loss of agricultural production in the event of an accident involving agent. In the FEIS, all assessments related to agriculture have been coordinated into new sections (Sections 4.2.3, 5.2.3, 6.2.3, and 7.2.3) so they are easier to find.

Comment DD-9: The EIS needs to provide a better idea of what the damages to livestock would be if there were an accident, particularly long-term effects. [*Document 50-3*]
Response DD-9: The fate and biological effects of agents are discussed in Appendix A of the ACWA DEIS. In the new agriculture section of the FEIS, some discussion is included in terms of the effects on plants and animals.

Comment DD-10: One of the EISs listed all of the agricultural products grown in the area. I was curious why that wasn't done for Pueblo. And I would expect the list to be included in the final draft. The diversity of agriculture in this area is high. [*Document 50-8*]
Response DD-10: Your comment is noted. For each of the sites, the ACWA EIS lists the five or six most important crops by acreage, and then the total value of harvested crops and of livestock. While some of the sites have additional crops, none of these crops are of major significance (in terms of value or acreage) when compared to those listed.

EE OTHER IMPACTS

Comment EE-1: The EIS states in Section 7.23.3 that ACWA facilities would be decontaminated and demolished and that the land would be returned to long-term productivity. This statement seems to imply that the fate of the facility, in regard to closure, has already been determined. It also implies that statements on closure are within the scope of this EIS. Please clarify. These statements seem to be in conflict with the other land use sections. [*Documents 26-30, 115-59*]

Response EE-1: This EIS statement was made with regard to "short-term use of the environment and enhancement of long-term productivity," a subject required by NEPA to be included in any EIS. Chapter 8 of the EIS deals with assumptions about closure and decontamination. No decision has been made with respect to closure of an ACWA facility. However, it should be noted that an ACWA facility, whether a pilot test facility or operational facility, would destroy ACWs only for as long as the stockpile lasts. At some point, the facility would have to be closed and decontaminated, no matter what its eventual fate would be. The EIS addresses the impacts of closure and decommissioning to allow such considerations to be taken into account when an agency is deceding whether to undertake the proposed action.

FF MITIGATION AND MONITORING

Comment FF-1: The public wants to be kept informed about the environmental performance of the chemical weapons destruction technologies. They are very interested in the performance of other facilities and will be especially interested in performance from initial startup through facility closure. We recommend that the monitoring sections include a program to keep the public informed continuously throughout the project. We recommend this information both confirm the technology performance assumptions made in the EIS and demonstrate compliance with the applicable environmental regulations. [*Documents 120-2, 135-2*]
Response FF-1: Comment is noted. However, as noted in Chapter 9, this public information effort will be done as part of regulatory and permit requirements. PMCD has outreach offices at each of the installations being considered by ACWA. In addition, each installation has a citizens' advisory committee. ACWA, has from the beginning, been an open process.

Comment FF-2: The FEISs should also develop plans to mitigate the impacts of the proposed facility on agriculture. The farmers, ranchers, and agricultural workers would be the best sources for potential mitigation efforts. [*Documents 120-11, 135-11*]
Response FF-2: Normal operations of an ACWA pilot test facility at PCD or elsewhere would not impact agriculture. As discussed in the EIS, the greatest risk from any of the alternatives is from storage of ACWs. Each site already has monitoring procedures and a Chemical Stockpile Emergency Planning Program (CSEPP) in place; these are taken into account in the EIS analyses as part of the existing site conditions. The agricultural community has the opportunity to participate in CSEPP. Detailed design and engineering studies on ACWA technology systems are underway that should provide the basis for a more-facility-specific monitoring and mitigation plan for an ACWA pilot test facility. This level of detail is more appropriate for the facility permit than the EIS. Involvement of the farming community in any emergency planning for accidents at the installations would be appropriate.

Comment FF-3: As a general statement, we urge precautionary and preventative measures to be taken at every step of the construction and operations phase. These principles apply to all potential impact areas, including those areas that the EIS feels do not require mitigation. [*Documents 108-33, 119-38, 115-60*]
Response FF-3: Comment is noted.

Comment FF-4: This DEIS summary does not include a detailed description of the monitoring that will be conducted during the pilot treatments (a description that includes locations of, for example, work areas, fence-line perimeters, and downwind communities). Since some of the compounds and their intermediaries are difficult to detect in real-time settings, monitoring proposal(s) should be more definitively described in the final document. A review of destruction efficiencies predicted for each of the proposed treatment methods should be available in the final document.

On p. 4-98, the DEIS needs to indicate what type of monitoring devices would be employed during the treatment process. More information needs to be provided regarding the time needed to reliably identify a source release, the backup systems that will be available, and the accuracy of these monitoring systems in detecting an agent release.

How is the alarm for the detection systems activated? What is the likelihood of false positives triggering an alarm (or of the reverse situation, in which a release would fail to trigger an alarm)? Who will oversee activation of the alarm system, and is there a manual activation setting? Will persons off the ANAD facility be capable of hearing the alarms (irrespective of wind direction and climatic conditions)? How will monitoring be verified to avoid either panic situations, or worse, a lack of response to a significant release? The DEIS does not provide specific details with respect to training events, planning procedures, or contingency plans in this regard. Furthermore, the DEIS does not specify how quickly the monitoring system can become re-operational should there be an outage resulting from severe weather, electrical failure, etc. [*Documents 120-50, 120-55*]

Response FF-4: This level of detail is more appropriate for the facility permit than the EIS. However, the monitoring procedures and the CSEPP are taken into account in the EIS analyses. After the ACWA Record of Decision, when one or more installations and technologies are selected for pilot testing, facility location(s) will be selected and monitoring plan(s) will be developed. Monitoring levels will also be set as part of the RCRA process, once an installation and technology are selected.

Comment FF-5: For permitting purposes, a sampling, monitoring, and handling plan will need to be developed. [*Document 95-9*]

Response FF-5: Comment is noted.

Comment FF-6: We disagree with the conclusion in Section 6.24: "Because no adverse impacts on land use..., socioeconomics or environmental justice (EJ) were identified, no mitigation would be required for these resource areas." There is an EJ community already identified. Previous operations at PCD have already impacted nearby EJ communities and will continue to do so during the period when depot closure and cleanup and implementation of the chemical weapons destruction facility are taking place. As discussed in our comments above and in Region 8's meeting on EJ at Pueblo, increased and focused information and communication would be appropriate types of mitigation for this project. See, in particular, our comments (#11 above *[Document 120-10]*) on agricultural risk assessment, technical assistance to the agricultural community, accidents impact analysis for agriculture, and an accessible information and monitoring program. [*Document 120-38*]

Response FF-6: While none of the impacts discussed throughout Section 6 are anticipated to be *high and adverse*, with regard to impacts on "environmental justice populations," it is appropriate to provide some mitigation. This effort includes providing public outreach and incorporating environmental justice concerns in decision making and permitting. It includes activities now underway at the installations, including those described in the responses provided in Section 3.DD on agriculture. This response does not mean that increased and focused information and communication, as recommended in the comment, would not be useful forms of outreach for increasing public awareness. However, recommending such outreach efforts is beyond the scope of the present document in the absence of high and adverse impacts.

GG ENVIRONMENTAL PERMITS AND OTHER COMPLIANCE REQUIREMENTS

Comment GG-1: Both the PCD and ACWA DEISs need to discuss any agent degradation products of concern. For permitting purposes, a sampling, monitoring, and handling plan will need to be developed. [*Document 95-9*]
Response GG-1: The ACWA EIS discusses the environmental fate and toxicity of agent degradation products in Appendix A. In Appendix C, which addresses human health from air emissions during normal operations, agent degradation products are included in the lists of compounds considered in the assessment. The requirement for a sampling, monitoring, and handling plan for permitting is noted.

Comment GG-2: None of the ACWA technologies would be regulated by the maximum available control technology (MACT) rule or other regulations specific to combustion facilities. [*Document 108-17*]
Response GG-2: Comment is noted. However, under RCRA 40 CFR 266, Subpart H, and as discussed in Chapter 9, environmental regulatory authorities could apply a variety of requirements, which could include those in the MACT rule.

Comment GG-3: These technologies appear to require very complicated hazardous waste facilities. It took approximately seven years to get a permit for the existing incineration facility. Please discuss the permit requirements for each technology. [*Documents 22-30, 62-7*]
Response GG-3: For permitting requirements, please see Chapter 9 of the ACWA EIS. The time period needed for a state to issue such permits varies from permit to permit and from state to state. The Army will ensure all permits are in place before beginning any activities that require state or EPA regulatory action.

Comment GG-4: The prior approval of the Commonwealth of Kentucky's Division of Water is required for an ACWA plant. [*Document 94-5*]
Response GG-4: Section 9.5.1.4 on ACWA facility operations states that (1) a permit is required for construction of a new wastewater treatment plant, (2) a certification of completion must be submitted to the Facility Construction Branch, and (3) the existing National Pollutant Discharge Elimination System (NPDES) permit must be amended for the new discharge. As stated in the comment, the WLA request and recognition of the "receiving waters" classification would affect the discharge limits established by the Division of Water in the new permit. [*Document 94-5*]

Comment GG-5: Although outside the scope of this EIS, we point out that all the ACWA technologies are classified as "nonemissive" treatments when compared to baseline incineration. [*Documents 108-17, 115-20, 119-17*]
Response GG-5: ACWA technologies do have air emissions and solid waste emissions, as discussed in the appropriate sections of the EIS.

Comment GG-6: In Arkansas, the U.S. Army and Arkansas Department of Environmental Quality (ADEQ) signed an order concerning chemical weapons and when chemical weapons are considered a hazardous waste. [*Document 120-71*]

Response GG-6: Comment is noted. Text changes have been made to Sections 9.2.4 and 9.2.4.2 to indicate that PBA and the ADEQ will use the Consent Order, along with current ADEQ regulations, to determine the appropriate management (e.g., storage and treatment) of these wastes. However, the ADEQ has not promulgated ADEQ regulations to include chemical weapons, chemical agents, or their treatment residues as "listed" hazardous waste under ADEQ regulations (ADEQ Regulation No. 23, Section 261).

HH CLOSURE AND DECOMMISSIONING

Comment HH-1: Will any facility be used after the weapons are gone? [*Documents 24-2, 28-3, 81-1, 91-2*]
Response HH-1: Section 8 of the EIS addresses the potential future of an ACWA pilot facility. Any option for continued use of an ACWA pilot test facility is speculative and subject to a number of constraints. Additional analyses will be needed should any action other than closure and decommissioning be proposed.

Comment HH-2: Section 8, Closure and Decommissioning, lists the steps involved in closure. Sampling to verify closure requirements was not included in the list and needs to be added. [*Document 95–24*]
Response HH-2: Sampling to verify closure has been added to the text describing the steps.

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